

STUDY FOR THE REDEVELOPMENT

OF SUDAN'S ROAD, RAIL, AND PUBLIC TRANSPORT INFRASTRUCTURE POST-WAR

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1.0 EXECUTIVE SUMMARY

The reconstruction of Sudan, following its conflict, presents an urgent and historic opportunity to rebuild not only infrastructure, but also the institutions and economic foundations essential for long-term stability. Among the most critical pillars of this recovery is the redevelopment of the country's transport systems, which have historically been underdeveloped and have further deteriorated due to the recent conflict.

This report outlines a strategic, phased, and inclusive approach to rehabilitating Sudan's road, rail, and public transport infrastructure, framing transport investment as essential for fostering national cohesion, enabling economic renewal, and improving service delivery across both urban and rural areas.

Strategic Vision

Transportation in Sudan must be repositioned not merely as a technical sector, but as a strategic enabler of state legitimacy, territorial integration, and social and economic mobility. Without functioning transport systems, recovery efforts across health, education, commerce, and governance will remain severely constrained. This report advocates for a bold yet realistic transport redevelopment plan that is centred on three priorities: immediate post-war stabilisation and mobility restoration; medium-term infrastructure rehabilitation and institutional reform; and the long-term transition to a modern, sustainable, and integrated national transport network.

Recognising the scale of the challenges, the strategy proposes sequencing interventions carefully, prioritising corridors and regions based on impact and feasibility, and progressively building institutional capacity to manage and sustain redevelopment efforts.

Current Context and Damage Assessment

Sudan's road and rail infrastructure was already fragile prior to the conflict. Years of war have rendered large sections of it inoperable. Major intercity highways have become impassable, the national rail network, once among the largest in Africa, is now almost entirely dormant, and public transit systems in Khartoum and secondary cities have ceased to function altogether. In the absence of formal systems, informal and unsafe modes of transportation, including private pickups and overcrowded minibuses, now dominate urban mobility.

The collapse of transport infrastructure has disrupted markets, displaced populations, severed access to basic services, and undermined national connectivity. The resulting economic consequences are profound: transport costs have soared, trade has been delayed, and labour mobility has been restricted, stifling both livelihoods and economic recovery. As detailed in this report, rehabilitation efforts must begin with a realistic assessment of what remains functional, what can be repaired, and where strategic investments will yield the greatest immediate and long-term benefits.


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Historic Overview and Lessons Learned

Sudan's transport history is rooted in colonial-era infrastructure that was primarily built to serve extractive, rather than developmental, goals. Under the Anglo-Egyptian condominium, railways were designed to connect export-oriented agricultural zones to ports, rather than to connect communities to one another.

Following independence, Sudan inherited an extensive but unbalanced system. Efforts to reform and expand the network during the 1960s to 1980s were undermined by political instability, mismanagement, and shifting development priorities. More recent initiatives, including public-private partnerships with Chinese and Gulf actors, have produced mixed results, often hampered by weak contractual oversight and limited transparency.

Strategic Pillars of Redevelopment

This report proposes a national transport redevelopment strategy organised around six core pillars. First, Road Network Rehabilitation is vital. Sudan's road network is sparse, with only a small fraction paved, and most major highways significantly damaged. Immediate priorities include reopening and repairing critical corridors such as Khartoum–Port Sudan, Khartoum–Atbara, and Nyala–El Fasher. Upgrading rural roads in agricultural zones is crucial to support food security, while rehabilitating key bridges, particularly those across the Nile, will address major chokepoints for economic movement. Furthermore, introducing intercity toll systems will help generate sustainable revenue streams for maintenance.

Second, Rail System Modernisation is essential. Although currently dormant, the Sudan Railways Corporation (SRC) remains a high-potential asset. Rehabilitation should focus on conducting immediate assessments and phased reopenings of critical corridors, such as Port Sudan–Khartoum. Plans should also include establishing regional rail connections with Egypt (via an Aswan link) and Chad, engaging diaspora engineers and international partners for network rehabilitation and electrification, and undertaking institutional restructuring of the SRC to restore governance and accountability.

Third, a Public Transport Overhaul must be pursued to address the collapse of urban mobility, particularly in Khartoum. The recommended actions include deploying structured bus rapid transit (BRT) corridors in Khartoum and Omdurman, supporting local manufacturing of buses to reduce dependency on foreign currency, regulating informal minibus operators through cooperative licensing schemes, and implementing integrated ticketing and passenger information systems.

Fourth, reforms to Maritime Infrastructure and Port Management are critical. Port Sudan, the country's sole maritime port, faces serious limitations in handling capacity, operational efficiency, and governance. Key reforms should involve re-establishing a National Ports Authority with modern governance structures and transparent revenue models, investing in modern handling equipment such as cranes, digitalising customs procedures, improving intermodal connections to road and rail networks, and positioning the port as a strategic logistics gateway for Sudan's landlocked neighbours.

Fifth, Airports and Domestic Aviation must be modernised. Sudan's air infrastructure remains underfunded and in poor condition. Priority actions include upgrading the Khartoum International Airport's runway, terminals, and safety systems; investing in regional airports such as those in El Fasher and Nyala to serve as humanitarian and commercial lifelines; utilising smaller aircraft fleets and modular terminal designs to reduce capital and operating costs; and formulating a national aviation strategy that encompasses both civilian and emergency response needs.

Sixth, Institutional Reform and Capacity Building are indispensable. No infrastructure investment can succeed without strong and professional institutions. This report calls for re-establishing a Ministry of Transport with clear mandates and semi-autonomous directorates, appointing a senior leadership team, including a Wakil (Permanent Secretary) with international and local experience, prioritising the recruitment of Sudanese professionals from the diaspora and neighbouring countries, and introducing robust public-private partnership legislation with strong legal safeguards.

Governance and Financing

A successful redevelopment strategy will depend on clear governance frameworks, robust financial planning, and transparent procurement processes. This report recommends creating a National Infrastructure Fund, accountable to Parliament, to coordinate donor and private investments. Additionally, the report proposes adopting performance-based contracting models for all capital works, mobilising domestic capital through infrastructure bonds, diaspora remittances, and fuel levies, and phasing projects carefully to align with fiscal and administrative capacity, beginning with corridors and services that offer the highest returns.

Role of Local and International Actors

Sudan cannot rebuild its transport sector alone. Multilateral partners such as the African Development Bank, the World Bank, and Arab Funds must play central roles in financing and technical support. However, all projects must remain Sudanese-led, aligned with the country's specific needs, geography, and political economy. To achieve this, the report stresses the importance of creating mechanisms that align donor investment with national priorities, establishing independent technical review panels to prevent politicisation, ensuring that foreign contractors work closely with Sudanese engineers and train local workers, and learning from past public-private partnership failures by improving legal frameworks and contract enforcement.

Inclusive Development

Transport planning must serve all Sudanese citizens, including women, youth, and marginalised groups. Recommendations include designing safe public transit systems.

Immediate Next Steps

To catalyse implementation, the report proposes a sequenced action plan.

Within the first six to twelve months, the Government should establish the Ministry of Transport and appoint its leadership team, conduct rapid assessments of existing road and rail infrastructure, reopen priority transport corridors to support humanitarian and economic recovery, draft enabling legislation for public-private partnerships and port authority reform, and launch pilot urban mobility schemes in Khartoum.

Over the next one to three years, the Government should mobilise investment for road and rail rehabilitation, begin the construction of intercity toll roads, roll out phased BRT networks and regulate minibus services, initiate airport safety upgrades, prepare a national aviation sector roadmap, and establish a national infrastructure database and monitoring systems.

Over the medium-to-long term, between three and ten years, the Government should expand the rail system to include regional connections with Egypt, Chad, and South Sudan, transition to integrated multi-modal transport networks, develop institutional partnerships with African and Gulf transport authorities, and embed maintenance, training, and innovation systems across all transport agencies.

Sudan's recovery will be profoundly shaped by its ability to restore mobility, connectivity, and confidence in public infrastructure. Roads, railways, ports, buses, and airports are not merely construction projects; they are vital lifelines. This report provides a clear and actionable strategy for rebuilding these lifelines in a manner that is financially sustainable, technically sound, and socially inclusive.

Summary

Sudan's recovery will be profoundly shaped by its ability to restore mobility, connectivity, and confidence in public infrastructure. Roads, railways, ports, buses, and airports are not merely construction projects; they are vital lifelines. This report provides a clear and actionable strategy for rebuilding these lifelines in a manner that is financially sustainable, technically sound, and socially inclusive.

With the right leadership, effective partnerships, and an unwavering commitment to good governance, Sudan's transport sector can not only recover from conflict, but also spearhead the broader national transformation that the country so urgently needs.

2.0 ABOUT THE AUTHOR



Adam Giambrone has over 25 years of experience in the transportation industry. He served as President of the Toronto Transit Commission (Canada) for five years, Director of Planning and Studies for Montreal's regional transit agency, and Director of Surface Rail Transit Expansion for the City of New York. Currently based in Riyadh and working for SYSTRA (a large French infrastructure planning and design firm), he oversees the delivery of large capital projects, including new metro lines in the city.

He has also held leadership roles as General Manager of the Saudi Public Transit Company (SAPTCO), Head of Transportation for the NEOM region of Saudi Arabia, and Head of Transportation for the Royal Commission of Al Ula (the local government authority for the Al Ula region). Adam holds an MBA from the University of Toronto (Canada) and an Executive MBA from the University of St. Gallen (Switzerland). He has provided advisory services to cities through the International Association of Public Transport (UITP) and the African Union of Public Transport (UATP).

Adam's involvement in Sudan dates back to the 1990s. He has lived in various regions of the country and brings with him a deep understanding of both Sudan's transportation landscape and its people.



Hussein Malik is an experienced public management professional with a strong track record in public management, transportation planning and infrastructure development.

He led the MSG BRTxpress initiative, focusing on the redesigning efficient, inclusive urban transit systems. He also played a key role in supporting the Sudan Railways Corporation (SRC) in management reform and restructuring.

His work reflects a deep understanding of complex transport systems and public sector coordination. Through this report, him and Adam Giambrone offer practical insights to post war restructuring.

3.0 INTRODUCTION

Sudan's transport system has been historically underdeveloped relative to its size and population and due to underinvestment and war has deteriorated over time, especially during the years of the most conflict. The original implementation of transportation infrastructure in Sudan was focused on providing colonizing forces with the infrastructure they needed for their priorities of maintaining security, moving colonial officials around and the export of Sudanese resources.

The conflicts that have raged in Sudan have had their effect. Road and rail networks have been significantly impacted, and public transit services, which were once a critical part of urban life, have largely ceased to operate. Following the war, there is an urgent need to rebuild these transport systems to support economic activity, facilitate the movement of displaced persons, and integrate them into urban areas.

Khartoum and other cities, such as Port Sudan, Atbara, Wadi Medani, and Dongola, have faced challenges maintaining public transport services over the years. The influx of displaced persons has compounded these challenges, requiring swift intervention to restore transport services and infrastructure. This study evaluates the current state of transport systems across Sudan and provides a plan for their redevelopment.



4.0

THE STRATEGIC ROLE OF TRANSPORTATION INFRASTRUCTURE IN SUDAN'S ECONOMIC RECOVERY & DEVELOPMENT

Sudan's transport infrastructure will play a central role in the country's economic recovery, national reintegration, and long-term development. Roads, railways, ports, airports, and public transit systems are not merely physical assets but the foundations of a functioning economy and an inclusive society. These systems enable the movement of people and goods, reduce costs for households and businesses, support state service delivery, and help knit together a geographically vast and socially diverse nation.

In the aftermath of the recent civil conflict, much of Sudan's already fragile transport infrastructure has been further degraded or disrupted. Critical trade and mobility corridors have been severed, and infrastructure that once supported commerce, basic services, and state presence has been rendered inoperable. Rebuilding these systems is a strategic necessity. It is about physical reconstruction and restoring the country's capacity to function and grow.

Transportation, however, is just one of many priorities a future Sudanese government will have to address. Health care, education, social protection, food systems, and national security will all require urgent and sustained attention. Nonetheless, without an effective transport system and the ability to move people, goods, services, and ideas, progress in nearly every other sector will be slower, more costly, and more uneven.

This chapter outlines the essential role of transportation infrastructure in Sudan's national recovery and development, drawing on its geographic position, historic economic role, and the current urgency of rebuilding.

4.1

TRANSPORT INFRASTRUCTURE & ECONOMIC DEVELOPMENT

Globally, well-functioning transport systems are fundamental to economic productivity and national competitiveness. They reduce the cost and time associated with moving goods, enable access to labour and consumer markets, and support trade, investment, and innovation. In urban settings, reliable transport allows workers to access employment affordably, businesses to reach customers with minimum costs, and public services to operate at scale. In rural areas, transport links determine whether agricultural producers can access markets and whether communities can access health care, education, and state support as well as ensuring that goods can be purchased without excessive costs for their transport.

Poor transportation infrastructure has long imposed severe economic costs in Sudan. Before the civil conflict, daily commuting costs in urban areas often consumed more than 10% of household income. In addition to direct travel expenses, households bore the burden of inflated prices for consumer goods, driven by inefficient logistics, road degradation, and supply-chain fragmentation. These conditions contributed to reduced competitiveness for Sudanese producers and persistent inequality in access to opportunity.

The need now is twofold. Sudan must reconstruct and expand its regional transport infrastructure to restore national and cross-border connectivity. At the same time, it must develop modern, efficient urban transport systems in major cities, particularly the tri-city region of Khartoum, Bahri and Omdurman, to support daily mobility, reduce congestion, and expand access to employment and services.



4.2 SUDAN'S STRATEGIC GEOGRAPHY & HISTORICAL ROLE

Sudan is geographically and historically positioned to serve as a regional transport and trade hub. Located in Northeast Africa, with a long Red Sea coastline and borders with seven countries, including landlocked states such as Chad and the Central African Republic, Sudan has long served as a corridor between North Africa and sub-Saharan Africa.

This historic role can be reasserted through targeted infrastructure investments. Sudan can integrate more deeply with Egypt's transport network to the north, particularly through road and rail connections to Aswan and onward to the Mediterranean. To the west, upgraded corridors to Chad (if the security situation improves) could re-establish Sudan as the eastern gateway to the Sahel. To the south, renewed links with South Sudan, extending potentially to Uganda, Kenya, and Ethiopia, could strengthen Sudan's participation in East African trade assuming political coordination could occur in a new political framework, a reality that is not guaranteed.

Internally, Khartoum must re-emerge as a national hub that connects all regions and integrates Sudan's economic geography. This will require a multi-modal approach to infrastructure that links urban and rural areas through rail, road, and air corridors.

4.3 PORTS & MARITIME ACCESS

Port Sudan is the country's primary maritime outlet and a critical economic asset. However, it currently suffers from inefficient cargo handling, outdated equipment, limited container capacity, and poor intermodal connections. These deficiencies raise the cost of imports and exports, restrict trade volumes, and reduce the port's ability to serve regional markets.

Rehabilitating Port Sudan is vital for restoring national economic functionality. With appropriate investment, it can also serve as a regional logistics hub for landlocked countries, particularly if rail and road corridors to the interior are improved. Improvements to port infrastructure, customs processes, and digital logistics systems could significantly reduce trade costs and create new employment and investment opportunities.

4.4 RAIL & ROAD NETWORKS

A modern, efficient railway network is essential for Sudan's long-term development. Rail offers a cost-effective and environmentally efficient mode of transport for bulk commodities and inter-regional freight. Once a vital economic artery, the Port Sudan–Khartoum line should be prioritised for rehabilitation, with future extensions westward towards Darfur and Chad and southward towards South Sudan as (and if) the security situation improves.

At the same time, Sudan's road network requires urgent investment. Paved roads cover only a fraction of the national territory, and many existing corridors are deteriorated or impassable for large portions of the year. Key priorities include the reconstruction of inter-city highways, upgrading rural roads, and connecting major trade and agricultural zones with markets and border crossings. These interventions will restore internal mobility, reduce logistics costs, and support inclusive growth across the country.

4.5 AIRPORTS & AIR CONNECTIVITY

Sudan's air infrastructure, especially Khartoum International Airport and Port Sudan Airport, is critical for diplomatic engagement, trade, diaspora mobility, humanitarian response, and emergency medical access. However, these facilities are operating well below international standards when they are able to operate at all. Upgrades to runways, terminals, and cargo-handling systems are essential to restoring functionality, but focus must be on utilitarian operations to as to not consume transportation resources that can be better spent elsewhere for more immediate benefit.

In addition, Sudan has a network of regional airports, including Nyala, El Fasher, Kassala, and Dongola among other, that could improve access to isolated regions. However, aviation is capital-intensive and expensive to operate. Any strategy for upgrading air transport must be pragmatic, prioritising safety and service continuity over high-cost expansion. Modular and dual-use designs (civil and emergency/security) can help ensure cost-effectiveness and strategic utility.



4.6

URBAN MOBILITY & PUBLIC TRANSPORT

In Sudan's major cities, public transport systems are informal, fragmented, and increasingly unsustainable. Workers in Khartoum and Omdurman, have in the past (and likely will again) faced long commutes, poor service reliability, and high transport costs. Informal minibus networks dominate but lack coordination, safety regulation, and sufficient capacity.

Introducing structured systems, such as bus rapid transit (BRT), would provide more predictable, affordable, and efficient mobility. Reducing reliance on imported vehicles and fuel would also ease pressure on Sudan's foreign currency reserves and allow households to spend more on domestic goods and services. In a recovery context, public transit can also serve as a stimulus for job creation, local manufacturing, and microenterprise development in maintenance and operations.



4.7

PEDESTRIANISM, URBAN DEVELOPMENT, & THE EVOLUTION OF STREET USE IN KHARTOUM

Khartoum's urban form was deeply influenced by its colonial history, particularly during the Anglo-Egyptian Condominium period beginning in the late 19th century. British colonial planners laid out the city using clear zoning distinctions that separated administrative, residential, and commercial functions. In this early period, particular attention was paid to the British quarters and administrative areas, where formal street grids, sidewalks, and even covered walkways were incorporated into the design.

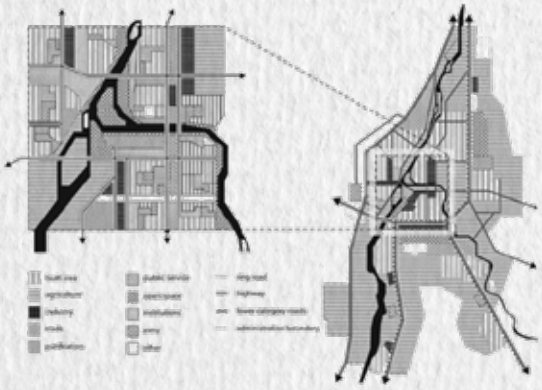
The emphasis on walkability reflected both British urban planning ideals of the time and the practical needs of the colonial administration. However, these investments were not equitably extended to the Sudanese-majority areas of the city, which often received little to no formal infrastructure, including sidewalks, drainage, or basic road maintenance.

Initially, pedestrianism played a dominant role in Khartoum's mobility system. Streets were conceived primarily as spaces for walking, social interaction, and modest vehicular use, including bicycles and animal-drawn carts. Covered walkways and tree-lined streets in certain areas provided shade, recognising the climatic demands of Khartoum's hot environment. Walking was not simply a mode of transport but an integral part of the city's urban life and social fabric.

As Khartoum grew through the 20th century, especially following Sudanese independence in 1956, urban development patterns increasingly shifted. Rapid population growth, limited urban planning capacity, and economic pressures led to expanding informal settlements and unplanned growth. Meanwhile, formal urban planning increasingly favoured vehicular traffic.



KHARTOUM HAS HAD SEVERAL URBAN PLANS - BUT NOT SINCE THE EARLY BRITISH TOWN PLANS HAVE THEY EVER BEEN EFFECTIVELY PUT INTO PLACE.



Khartoum development plan for 1960–1980 by Doxiadis, 1959, (left) and regional development plan, 1975–1990 by MEFIT. Prep. by Adam W. Chałupski, source: city planning archives



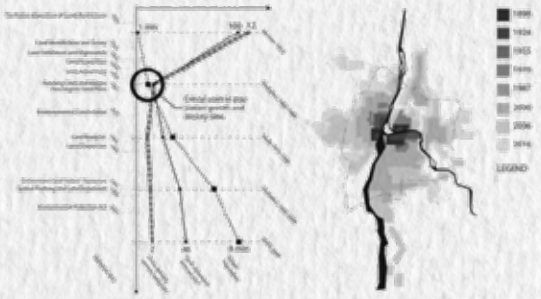
Low level of improvement in urban development. Photo: [in:] Authors' Archive



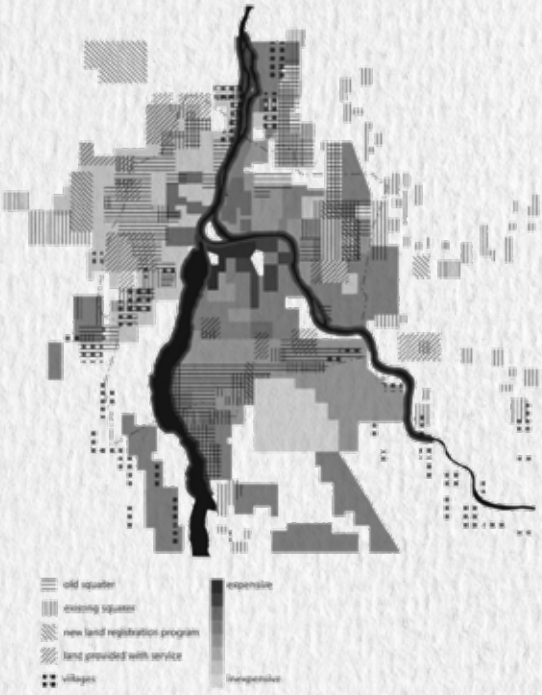
Khartoum structural plan for 1990–2000 by Doxiadis + Mustafa (left) and KPP 5 for 2013–2038 by MEFIT + CENETS published in 2006 (right). Prep. by Adam W. Chałupski. Source: city planning archives



KPP 5 regional plan 2013–2038. Prep. by Adam W. Chałupski, source: city planning archives



City planning event chronology 1898–2016 (left) and Khartoum historical expansion diagram 1898–2016 (right). Prep. by Adam W. Chałupski. Source: Zakaria, B.I. Pantuliano S.



Land prices in comparison to squatter zones and areas under solving programs. Prep. by Adam W. Chałupski, source: Eltayeb, G.E., Seif El Islam



Skeletons of modern urban landscape of Khartoum. Photo: [in:] Authors' Archive

Major road expansions, including arterial and collector roads, prioritised private vehicles and heavy transport, often at the expense of pedestrian infrastructure. Newer road designs in Khartoum gradually neglected sidewalk construction or maintenance, focusing instead on facilitating motorised movement. This shift reflected broader global trends of the mid-20th century and a sort of elite projection, where car-centric planning became dominant.

Despite these changes, the vast majority of Khartoum's residents, estimated at 85 percent pre-2023 conflict, relied on walking or public transit for daily mobility. Importantly, every public transit user is necessarily a pedestrian at the beginning and end of their journey, underscoring the vital importance of walkable environments.

Walking remains the most affordable mode of transport, requiring minimal infrastructure investment relative to vehicular roadways. Sidewalks, especially when constructed from gravel or compacted earth rather than pavement, are relatively inexpensive to build and maintain. Most arterial and collector roads in Khartoum are wide enough to accommodate sidewalks without sacrificing any significant vehicular access.

However, the key barrier to improved pedestrian infrastructure is less financial than regulatory. One of the major challenges is the occupation and obstruction of public rights-of-way. Private development encroachments, informal markets, parked vehicles, and other impediments frequently block sidewalks or force pedestrians onto dangerous roadways. Enforcement of the public right-of-way is therefore essential. Without it, even well-designed sidewalks would fail to serve their intended purpose.

Looking inside Khartoum's residential neighbourhoods, conditions vary. Traffic volumes within local streets are generally low, meaning pedestrian movement is relatively safe in terms of vehicle conflict. Nevertheless, poor surface conditions, such as mud during rainy seasons, accumulations of garbage, and uneven or eroded surfaces, pose significant obstacles to pedestrian access.

Implementing basic maintenance programmes, including road levelling, surface tidying, drainage improvement, and limited gravel applications where needed, would significantly enhance pedestrian mobility. This first-stage improvement would better connect residents to the conceptually higher-standard pedestrian walkways that should exist along major streets, facilitating access to public transport systems and vital services.

In broader urban planning theory, sustainable city development emphasises the "complete streets" approach, where streets serve all users, not just motorists. Applying these principles to Khartoum today means designing for multi-modality, where pedestrians, micromobility, public transit, and vehicles coexist safely. Given the high proportion of non-car users in Khartoum, this approach is not merely aspirational but essential for equitable and functional urban life.

Khartoum's original city planning did intend to organise space for public use, but its later adaptations did not keep pace with population growth and shifting mobility needs. The spatial division between well-planned administrative centres and neglected peripheral Sudanese areas led to a two-tiered urban experience, a pattern that persisted well into the 21st century. As the city expanded, the absence of a comprehensive, inclusive urban mobility framework meant that informal systems filled the gaps, resulting in congestion, traffic hazards, and environmental degradation.

Today, Khartoum stands at a critical juncture. Rebuilding after the recent conflict offers an opportunity to correct past mistakes. Urban transport policy must integrate pedestrian infrastructure at its core. Sidewalks must be recognised not as ancillary luxuries but as fundamental elements of the public realm, crucial to economic participation, education access, public health, and social inclusion.

5.0 LESSONS FROM PREVIOUS PUBLIC PRIVATE PARTNERSHIPS (P3S)

Sudan's past infrastructure development included a number of public-private partnerships (PPPs or P3) with foreign firms, particularly from China. While these partnerships brought financing and speed, many were marked by poor contract structuring, weak oversight, and inadequate quality assurance.

As a result, some assets were delivered below standard or deteriorated quickly, leaving the country with significant liabilities and limited value for money. Moving forward, Sudan must approach P3s (often called BOTs: "Build-Operate-Transfer, although this precludes the use of operations in the P3 model) with a stronger legal framework, transparent procurement processes, and professionalised contract management. Effective governance is not a secondary concern; it is central to ensuring that infrastructure investment delivers tangible, lasting benefits to the public.

5.1 LEVERAGING SUDANESE EXPERTISE

Sudan has a large pool of qualified engineers, planners, architects, and infrastructure professionals working across Africa and the Middle East. Many of these individuals have worked on major international transport and construction projects in the region and around the world and are eager to contribute to Sudan's reconstruction.

The government and its partners should create clear pathways for leveraging this expertise through diaspora engagement initiatives, temporary advisory contracts, and incentives for return. Sudanese professionals bring not only technical skills but also an understanding of the local context, needs, and constraints. Their involvement will improve project design, cost control, and implementation.

5.2

INFRASTRUCTURE & NATIONAL COHESION

Sudan's long-standing fragmentation across regions, cultures, and economies has been deepened by years of underinvestment in infrastructure. Poor transport links have made it more difficult for communities to access services, for markets to connect, and for the state to maintain a meaningful presence across its territory.

A modern, inclusive transport network can help reverse these dynamics. Transport infrastructure supports political cohesion, service delivery, and a shared national identity by linking regions to one another and the capital. It enables a more unified, responsive, and resilient state.

This chapter has presented the case for rebuilding and investing in transportation infrastructure as a strategic pillar of Sudan's national recovery. While not a cure-all, transport systems are foundational: they shape economic opportunity, social inclusion, and national resilience. Addressing Sudan's transport challenges with foresight, integrity, and local leadership will be essential to building a stronger, more connected, and more prosperous country.



6.0

TRANSPORT HISTORY IN SUDAN

Understanding Sudan's transportation history is essential to informing efforts to rebuild the country's infrastructure in a way that is both effective and sustainable. Sudan's colonial and post-independence transport systems were shaped by geopolitical, economic, and administrative priorities that continue to influence regional connectivity, settlement patterns, and institutional structures today.

By examining the legacy of rail corridors, river transport routes, and road-building strategies, as well as the shifts resulting from conflict, neglect, and decentralisation, planners can identify both systemic weaknesses and underutilised assets. This historical lens allows for a more strategic redevelopment approach that aligns with current needs for national integration, economic recovery, and inclusive access to services.



6.1

TRANSPORTATION IN SUDAN PRIOR TO THE COLONIAL PERIOD

Before the 1870s, transportation in what is now Sudan was shaped by geography, climate, and traditional trade and administrative systems. The region lacked any modern infrastructure, and there were no railways, paved roads, or mechanised vehicles. The movement of people and goods relied almost entirely on animal transport, river navigation, and human portage, with transportation patterns closely tied to trade routes, seasonal changes, and the structure of precolonial polities.

Precolonial States' Transport systems were influenced by the administrative needs of kingdoms and sultanates such as the Funj Sultanate (Sennar), the Sultanate of Darfur, and tribal confederations. These systems supported military campaigns, tax collection, and trade regulation, but no state-built infrastructure existed. These states did not have the tax revenue or capacity to fund roads, bridges, or canals. Infrastructure, such as caravanserais (rest stations), water wells, and river ports, were generally constructed and maintained by local communities, religious authorities, or merchants.

In Northern Sudan, Egyptian occupation started with the invasion by Mohamed Ali Pasha in 1820. It focused on exploitation and involved minimum investment and maximum exploitation.

The one exception was the early railway effort for the construction of a short rail line between Wadi Halfa and Sarras along the Nile's Second Cataract in northern Sudan. This was intended to bypass the difficult river navigation around the cataract and facilitate trade and military movement deeper into Sudan. The line was constructed in 1874 under the Egyptian administration. It was standard gauge and roughly 54 km long. The railway used imported materials and rolling stock from Europe.

The Wadi Halfa–Sarras line was primarily envisioned as a logistical aid to supply Egyptian garrisons in Sudan and to develop access to potential mineral resources and trade routes. However, the line was poorly maintained, underutilised, and never extended further south. It ultimately suffered from low demand, technical challenges, and limited financial returns.

These early efforts were driven by strategic, economic, and logistical motivations but were hampered by technological constraints, political instability, and the absence of strong colonial control.

CAPE GAUGE, THE CHOICE FOR SUDAN

Cape gauge was chosen due to the availability of materials and was the gauge already in use in many British colonies likely due to the fact that it was less expensive to build as it required less earthwork, lighter rails and small bridges. These factors were key for constructing the railway over vast distances. The railroad was also conceived as part of a future Cape to Cairo railway project that was never completed.

While Cape Gauge offers certain advantages, such as reduced construction costs and the ability to navigate tighter curves, they also present limitations in terms of freight capacity and structural robustness compared to standard gauge railways, which have a track width of 1,435 mm (4 ft 8½ in).

One of the primary constraints of Cape gauge railways is their lower axle load capacity. Typically, Cape gauge lines support axle loads of up to 20 tonnes, whereas standard gauge lines can accommodate higher axle loads, often exceeding 25 tonnes. This limitation restricts the weight of individual freight cars and, consequently, the total weight of trains, impacting the volume of goods that can be transported efficiently.

Additionally, the narrower track width of Cape gauge railways imposes restrictions on the size of rolling stock. The loading gauge, the maximum height and width of railway vehicles, is inherently smaller, limiting the dimensions of freight containers and preventing practices like double-stacking, which are feasible on standard gauge lines. This constraint reduces the overall cargo volume per train and affects the economic viability of freight operations.

Operational efficiency is also impacted by the limitations of Cape gauge railways. The reduced stability associated with the narrower gauge necessitates lower operating speeds to ensure safety, particularly when transporting heavy loads. Furthermore, the tighter curves and steeper gradients that Cape gauge railways can navigate, while advantageous in certain terrains, can lead to increased wear and tear on both tracks and rolling stock, resulting in higher maintenance requirements and costs.

In contrast, standard gauge railways offer enhanced stability, allowing for higher speeds and greater freight capacities. The broader track width supports larger and heavier rolling stock, facilitating the transport of more substantial cargo volumes. Moreover, the compatibility of standard gauge with international railway networks simplifies cross-border trade and logistics, providing economic advantages in a globalized market.



THE TOKAR, TRINKITAT LIGHT RAILWAY

The Tokar–Trinkitat Light Railway was a narrow-gauge agricultural railway constructed in the early 20th century near Sudan's Red Sea coast to support cotton cultivation and export.

Built with a 600 mm gauge, the railway extended approximately 35–40 kilometres from Tokar, an agricultural settlement in the Tokar Delta, to Trinkitat, a minor port on the Red Sea. Its primary function was to transport cotton bales and other agricultural goods for export. The line operated seasonally, similar to the Gezira railway in alignment with the cotton harvest and relied on small steam locomotives and basic freight wagons. Despite its rudimentary construction and challenging sandy terrain, the railway played a critical role in supporting colonial Sudan's export economy.

The Tokar–Trinkitat line ceased operations by the mid-20th century due to the rise of road transport and the broader decline of narrow-gauge systems.

THE NILE TRAIN

The Khartoum–Atbara passenger rail service, known as the "Nile Train," was reintroduced in 2014 as part of Sudan's efforts to revive its railway system. This service covered approximately 330 kilometres along the Nile River, providing an affordable and reliable transportation option amid economic challenges and rising fuel costs.

A one-way fare was approximately US$4.50 making it significantly less expensive than intercity bus travel. The train operated between Khartoum North and Atbara with key stops in Shendi and Ad-Damir, serving important towns along the Nile corridor. Trains were powered by diesel locomotives and used simple carriages designed for practical mass transport.
Despite initial success, the service faced challenges such as poor track conditions, institutional limitations within the Sudan Railways Corporation, and difficulties sourcing durable spare parts due to international sanctions. These factors contributed to the service's decline, with operations becoming sporadic and eventually ceasing.



6.1.1

OVERLAND TRANSPORT'S ROLE IN SUDAN

The camel caravan was the dominant form of overland transportation, particularly in northern and central Sudan. Camels, well-adapted to the desert and semi-desert environments, were essential for long-distance trade across the Sahara and between towns like Dongola, Berber, and Omdurman. Donkeys were more commonly used for local transport, especially in southern and eastern regions where terrain was less suited to camels.

Long-established trade routes connected Sudan to Egypt, Darfur, Chad, and the Arabian Peninsula. These caravan routes facilitated the movement of goods such as ivory, gold, textiles, gum arabic, and salt. Pilgrimage routes also played a key role, linking Muslim communities across Sudan and West Africa via Darfur to the Hajj corridor through Suakin and onward to Mecca.

There were no engineered roads. Tracks were informal, created by repeated use, and often shifted with seasonal conditions. Travel was slow, hazardous, and expensive, particularly during the rainy season or conflicts.



6.1.2

RIVER TRANSPORT - THE NILE & TRIBUTARIES

The Nile and its main tributaries, the Blue Nile, White Nile, and Atbara River, were the main transport arteries for bulk goods and long-distance travel, particularly in central and southern Sudan. Boats and rafts, often made from wood and papyrus, were used for downstream transport.

Traditional boats, such as shallots and marks, were powered by sail or poles and transported cargo and passengers between major riverine settlements, including Dongola, Khartoum, and Sennar.

While river transport was often more efficient than land routes, navigation was limited by cataracts, seasonal fluctuations in water levels, and the absence of port facilities. The Fifth and Sixth Cataracts posed major barriers to uninterrupted navigation between Khartoum and the north. At the same time, the 4th and 3rd Cataracts presented challenges, especially at low water times of the year.



6.1.3

THE NILE: *A SIGNIFICANT BARRIER TO TRANSPORTATION*

Pontoons, flat-bottomed ferryboats, have historically played a vital role in enabling crossings of the Nile in Sudan, particularly before the widespread construction of permanent bridges. These vessels were essential for transporting people, vehicles, and goods across the river, helping to link regions and sustain economic activities. Official pontoon crossings were established at regular intervals and at sites of villages and other destinations and managed by government authorities to provide consistent and reliable river transportation and to give communities access to both sides of the river.

Initially, pontoons were made of wood using local materials and traditional boat-building methods. As demand grew and durability became a greater concern, many pontoons were upgraded with steel construction. The flat-bottomed hulls were designed to adapt to the Nile's varying depths and widths.

While some pontoons were motorised, others were manually propelled or towed by accompanying vessels. Over time, upgrades to the fleet were carried out to improve capacity and safety, including the installation of engines, reinforcement of hulls, and the introduction of more efficient loading mechanisms to support vehicles and heavier cargo.

In urban centres such as Khartoum and Omdurman, pontoons were embedded in everyday life. They provided essential links between residential districts and commercial hubs, supported access to schools and hospitals, and facilitated trade. Before bridges became common, these ferries were often the only way to cross the river within the city. Even after bridges were constructed, some pontoons remained in use, particularly in areas lacking bridge infrastructure or during periods of bridge maintenance. Their continued operation reflected their lasting role in Khartoum's and Omdurman's transport systems.

The arrival of metal pontoons in Sudan was influenced by British colonial infrastructure policies and international trade links. During the late 19th and early 20th centuries, many of these pontoons were manufactured in British shipyards and transported to Sudan as prefabricated kits for local assembly along the Nile. This method followed practices seen in nearby Egypt, where vessels such as the Steam Ship Sudan were constructed in Scotland and assembled in Cairo.

Following Sudan's independence, the country continued sourcing pontoons and components from European manufacturers, but Sudanese authorities also established domestic facilities for assembling, maintaining, and repairing pontoons, enabling the adaptation of imported parts to suit local conditions.

Overall, government-operated pontoons have played a critical role in Sudan's transportation history, ensuring mobility and supporting the social and economic integration of communities along the Nile.

6.1.4 REGIONAL VARIATION

In the arid Northern regions of Nubia and the Bayuda Desert, transport depended heavily on camel caravans and river navigation along the Nile. Settlements were concentrated near the river, and most trade was oriented northward towards Egypt.

Eastern Sudan had limited overland infrastructure. The historical port of Suakin was linked by camel routes to the Nile valley and the hinterland. Trade through Suakin connected Sudan to the Arabian Peninsula and the wider Indian Ocean world.

Western Sudan (Darfur and Kordofan) was integrated into trans-Saharan trade networks since trans-Saharan crossing become regularly possible with the introduction of the dromedary camel from Arabia in the 4th-5th century AD, although the earliest accounts note this travel began in the 3rd century. Caravans moved goods across the desert to Libya and the Sahel. The Sultanate of Darfur maintained its own trade-based transportation system centred on El Fasher and Kobbei.

Meanwhile in South Sudan the Nilotic and Equatorian regions, high rainfall and thick vegetation limited overland travel. River transport was more important, but seasonal flooding and swamps (e.g., the Sudd) made navigation difficult. Human portage and dugout canoes were commonly used.



Roads and cities are often affected by heavy rains and floods due to poor water management infrastructure. This can lead to delays and at times having areas cut-off due to roads becoming impossible.

6.2

TRANSPORTATION POLICY IN SUDAN DURING THE BRITISH CONDOMINIUM (1899 – 1956)

During the Anglo-Egyptian Condominium period (1899–1956), the development of transportation infrastructure in Sudan was a central instrument of British colonial policy. The transport system was not designed to serve the mobility needs of the Sudanese population or to support balanced national development. Instead, it was structured to consolidate imperial authority, facilitate the extraction and export of agricultural and natural resources, and enable efficient military and administrative control across Sudan's vast and diverse territory. The Ministry of Communications and Works was the administrative unit that oversaw transportation in Sudan. Within the Ministry there was the Public Work Department (Bridges, government building, ports and road construction and maintenance), Steamers Service (managed Nile and Blue Nile riverboats), Telegraphs and Postal Services, Sudan Railways Administration and later the Aviation department. The Ministry was headed by a Director General (or Under Secretary) and reported to the Governor General although policy coordination occurred through the Civil Secretary's Office which oversaw budgets, high-level staffing and legislative matters.

The most significant component of British transportation strategy in Sudan was the expansion of the railway network. Railways were viewed as a strategic colonial asset, essential for moving troops, equipment, administrative personnel, and commercial goods across challenging terrain. The origins of Sudan's railway system lay in military necessity. The first major rail construction took place during the British campaign to reconquer Sudan from the Mahdist state. In the late 1890s, the Sudan Military Railway was rapidly built, beginning with the line from Wadi Halfa to Abu Hamed and later extended through Atbara to Khartoum. This rail corridor became the logistical backbone of General Kitchener's military campaign between 1896 and 1898 and was pivotal in securing British victory at the Battle of Omdurman.

Following the re-establishment of colonial authority, the railway shifted from a purely military function to a tool for colonial administration and economic development, as defined by British interests. The network was gradually extended southward to Sennar and westward to El Obeid, eventually reaching key regions such as Kassala, Kosti, and the agricultural zones along the Blue Nile. Rail lines were deliberately routed to connect areas of high agricultural productivity, especially cotton-growing zones, to Port Sudan, which had been developed into the principal colonial port on the Red Sea. The Gezira Scheme, initiated in the 1920s to irrigate and cultivate large quantities of cotton for export, depended heavily on rail transport to move harvested crops to the coast for shipping to British textile markets.

Throughout the Condominium, the rail system remained under British leadership despite nominal Sudanese administration. The Sudan Railways Corporation operated on Cape gauge (1,067 mm) track and utilised a fleet of steam and, later, diesel locomotives. Its operational and mechanical headquarters were based in Atbara, which emerged as Sudanese rail transport's administrative and technical centre. By the early 1950s, the network extended over 4,500 km making it one of the largest in Africa. However, this system primarily served colonial economic extraction and administrative consolidation rather than fostering equitable internal development or national integration.

In parallel with the rail system, the British invested in river transport as an important but secondary mode of movement. Prior to the full extension of rail lines into southern and western regions, the Nile and its tributaries provided vital arteries for movement. Paddle steamers and barges were employed to navigate the Blue Nile, the White Nile, and Sobat Rivers, carrying government officials, commercial goods, construction materials, and passengers between Khartoum and the southern provinces, particularly in the Upper Nile and Equatoria regions. The fleet, known as the Sudan Government Steamers (SGS), was a critical link between the capital and remote garrison towns or administrative outposts. River transport also played a supporting role in early infrastructure development projects, such as the construction of the Sennar Dam.

Despite its early importance, river transport was ultimately treated as subordinate to rail. The British limited investments in river port infrastructure and facilities remained rudimentary. Little effort was made to improve dredging, introduce navigation aids, or install mechanical cargo-handling systems. As the rail and, later, road networks expanded, the significance of river transport declined steadily in both policy and practice.

Road infrastructure development during the Condominium was slow and received minimal investment in the early decades. Before 1920, most roads were little more than unpaved caravan tracks or traditional animal paths. Some engineered roads around Khartoum and central Sudan were developed to connect administrative centres or serve military logistics. It was not until the 1930s that the colonial government began constructing more durable roads, typically surfaced with gravel. These roads were designed to supplement the railway network, especially in regions where construction was economically unjustifiable. They also served the expanding cotton and gum arabic sectors by improving access to production zones.

The outbreak of the Second World War led to a marked increase in road building, as Sudan became a strategic supply corridor for the Allied war effort in North and East Africa. New roads were constructed to link Khartoum with Egypt, Eritrea, and British-controlled East Africa. Other routes opened access to regions such as the Nuba Mountains, the Red Sea Hills, and remote parts of southern Sudan. Nonetheless, even with this wartime boost, the road system remained fragmented, poorly maintained, and secondary to the rail network. No comprehensive or unified national road strategy was implemented during the Condominium, and peripheral areas remained poorly connected.

Air transport emerged as a new and increasingly important element of Sudan's transportation system in the 20th century. Civil aviation was introduced in the 1920s and initially focused on mail and government travel. Khartoum became the first major airfield equipped with a modest terminal, and additional landing strips were soon established in towns such as Port Sudan, El Fasher, Wadi Halfa, and Malakal. These airstrips were often simple grass or gravel runways and served limited functions, but they expanded administrative reach and facilitated communication with remote regions.

Sudan's position along the London–Cape Town air corridor brought it into the network of British Imperial Airways, later British Overseas Airways Corporation (BOAC), making Khartoum an important regional stopover in British imperial aviation. Aircraft were also used extensively for military reconnaissance, aerial photography, mapping, and internal surveillance. On a much more negative level, the use of military aircraft to intimidate and attack Sudanese was part of an ongoing strategy of military control of the population the British devised.

These aerial operations were especially valuable in difficult-to-access regions such as the south, Darfur, and Sudan's various border zones. The colonial authorities established a Civil Aviation Department in the 1940s to regulate this growing sector. It was responsible for air traffic control, airport operations, and coordination of domestic and international flights. By 1956, Sudan possessed a functional, though still limited, civil aviation infrastructure that supported administrative needs and a modest level of commercial passenger and freight traffic.

By the time of Sudan's independence, the country had inherited a transportation system that was extensive in some respects, particularly in rail, but deeply imbalanced. The transport networks were designed to reinforce colonial priorities: exporting goods, controlling territory, and sustaining imperial communication. They were not intended to support equitable economic growth, regional integration, or national development. As a result, post-independence Sudan faced the considerable challenge of repurposing and expanding its inherited transport infrastructure to meet the needs of a sovereign, and diverse nation.



Early float plans based near Khartoum and using the Nile as a runway.

BRITISH OVERSEAS AIRWAYS CORPORATION (BOAC) IN SUDAN

To build political and public support and Imperial Airways, BOAC, and Their Impact on Sudan
Imperial Airways, the forerunner of British Overseas Airways Corporation (BOAC), played a foundational role in introducing commercial aviation to Sudan in the early twentieth century. Beginning in the late 1920s, Imperial Airways established Sudan as a critical stopover on its emerging air routes between Britain and its colonies in East Africa, India, and Australia. Khartoum, positioned strategically along the Nile, became a key refuelling and staging post, with services initially linking Cairo, Khartoum, and onwards to Nairobi and Cape Town.

By the 1930s, Imperial Airways operated regular flying boat and landplane services through Sudan. Stops in Khartoum, Port Sudan, and Wadi Halfa connected Sudan to the global imperial air network, bringing faster communications, mail, and limited passenger services to a region previously isolated by desert and river barriers. These early air links enhanced British administrative control, allowing for quicker movement of officials, diplomatic messages, and commercial goods across the empire.

The introduction of air services contributed to Sudan's limited integration into global trade and information networks. It shortened travel times dramatically compared to traditional river and camel routes, fostering modest commercial activity around key airfields and supporting early urban growth, particularly in Khartoum and Port Sudan. However, the services largely served imperial needs rather than broader Sudanese development, with local populations benefiting indirectly, if at all.

After the Second World War, Imperial Airways merged into BOAC in 1940. BOAC continued and expanded air services through Sudan, with Khartoum remaining an important stop on the Britain–South Africa and Britain–Asia routes. Post-war air operations supported the gradual modernisation of Sudanese cities, promoted the early development of local aviation infrastructure, and laid the groundwork for Sudan's own national airline, Sudan Airways, founded in 1946 under the auspices of the Sudan Railways Corporation.

While the Imperial and BOAC air links primarily reinforced British colonial interests, they left a lasting legacy. The establishment of airfields, communication facilities, and aviation administration in Sudan contributed to the country's ability to develop its own civil aviation sector after independence. Furthermore, the experience gained by Sudanese workers in maintenance, airport operations, and logistics under British guidance provided an early technical workforce for Sudan's emerging aviation sector.



6.3

POST-INDEPENDENCE TRANSPORT DEVELOPMENTS

After Sudan gained independence in 1956, the country faced a rapidly growing urban population and an expanding need for transportation infrastructure general and public transport in the new and growing cities. However, the development of modern urban transport systems was slow, hindered by political instability, ongoing conflict, and insufficient investment.

Upon Sudan's independence on January 1, 1956, the newly established government recognised the critical importance of developing a cohesive transportation network to unify the vast and diverse nation. Consequently, the Ministry of Transport and Communications was formed as a central authority to oversee and coordinate the country's various transport sectors.



6.3.1

INITIAL STRUCTURE & RESPONSIBILITIES OF TRANSPORT OVERSIGHT BODIES IN SUDAN

The Ministry of Transport and Communications in Sudan has been instrumental in shaping the nation's transportation infrastructure since its establishment shortly after Sudan's independence. Over the decades, the Ministry has overseen the development and management of various modes of transport, including railways, roads, river transport, and aviation, adapting to the country's evolving needs and challenges.

Recognising the critical role of transportation in national development, the newly formed Sudanese government created the Ministry of Transport and Communications to centralise the planning and administration of the country's transportation systems. One of its primary responsibilities was overseeing the Sudan Railways Corporation (SRC), which managed the extensive railway network connecting key regions across the country.

The railways were instrumental in facilitating the movement of goods and passengers, thereby promoting economic growth and integration. The Ministry also focused on developing road networks, regulating river transport services along the Nile and its tributaries, and managing civil aviation to connect Sudan with international destinations.

In the subsequent decades, the Ministry expanded its oversight to include other modes of transport. This included the development and maintenance of road networks to improve accessibility to remote areas, the regulation of river transport services along the Nile and its tributaries, and the management of civil aviation to connect Sudan with international destinations. Finding sufficient resources historically has been a problem that limited the ministry's ability to implement the needed transportation projects.

KEY DIRECTORATES WITHIN THE MINISTRY:

- Railways: Overseeing the Sudan Railways Corporation (SRC), which managed the extensive railway network connecting key regions across the country;
- Road Networks: Developing and maintaining road systems to improve accessibility to remote areas;
- River Transport: Regulating river transport services along the Nile and its tributaries;
- Postal and telecommunication services;
- Aviation: Managing civil aviation to connect Sudan with international destinations.

Historically transportation governance in Sudan has been centralized with the federal government overseeing major transportation and policy decisions. However, provincial and state-level administration have played roles in implementing and managing transportation services within their jurisdictions but had limited autonomy.



Authors of the report meeting with Sudan Railway officials pre-conflict.

6.4

RAILROAD EXPANSION POST INDEPENDENCE

From the 1950s onward, Sudan's railway system experienced a dramatic arc from a position of continental prominence to prolonged decline, fragmentation, and limited revival. This evolution was shaped by political instability, shifting economic priorities, war, and chronic underinvestment. While Sudan once possessed one of the largest and most influential railway networks in sub-Saharan Africa, by the 2020s, much of that infrastructure had become inoperative or obsolete.

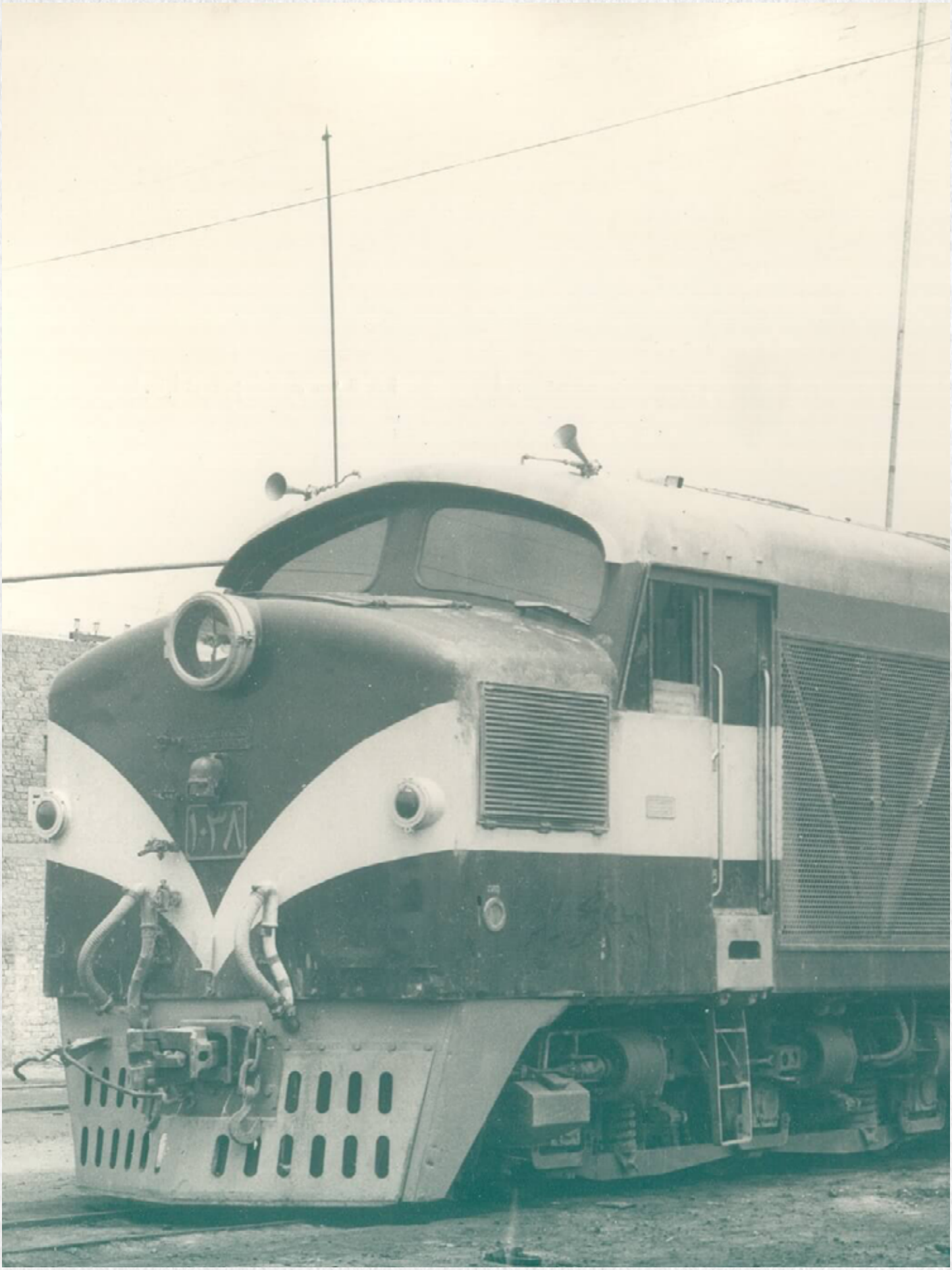
Following independence in 1956, Sudan inherited a robust railway system from the Anglo-Egyptian administration. The Sudan Railways Corporation (SRC), created as a state-owned enterprise, oversaw a network that spanned over 4,800 km, primarily constructed to Cape gauge (1,067 mm). This system linked key cities, including Khartoum, Port Sudan, Atbara, Wad Madani, El Obeid, Kosti, Wau, and Nyala.

The railways were central to freight and passenger transport and played a critical role in the integration of the national economy. Cotton and gum arabic, among other goods, were moved efficiently from inland agricultural zones to Port Sudan for export. At its peak in the 1960s, the railway handled approximately 80 percent of inland freight and millions of passengers annually. It was also one of the largest employers in the country, supported by a fully functional maintenance and training hub at Atbara.

Starting in the 1930's Sudan Railways operated trains within Khartoum and between the capital and its twin cities, Omdurman and Khartoum North (Bahri). These trains functioned as commuter services, linking the central railway stations with industrial zones, public housing areas, and marketplaces. They operated on existing rail infrastructure, offering short trips with basic, low platform stops and no dedicated urban rail terminals. The rolling stock consisted of standard railway coaches or simple railbuses powered by diesel engines. The service was most commonly used by railway workers, civil servants, market traders, and students, segments of the population that relied on affordable, regular transport. This service offered mobility at a time when buses and private cars were not yet widespread. They helped move large numbers of people across Khartoum's growing metropolitan area and were particularly important for connecting working-class residential zones with employment and administrative centres.

However, the 1970s and 1980s marked the beginning of a long and steady decline. Although the railways remained a strategic national asset, the system began to suffer from financial mismanagement, inefficient administration, and growing competition from road transport. As Sudan invested in donor-funded road infrastructure, particularly the Khartoum–Port Sudan corridor, truck and bus transport gradually eroded the railway's dominance. Operational problems became common: maintenance backlogs worsened, locomotives and wagons fell into disrepair, and chronic delays undermined public confidence. The network's reliability deteriorated, and the system increasingly became a financial liability rather than a developmental asset.

The 1990s and early 2000s witnessed near-collapse. The protracted armed conflicts that ran from the early 1980s to around 2005 severely disrupted railway services, particularly on southern and western lines. The route to Wau, in what is now South Sudan, was heavily damaged and ultimately fell out of service. During this period, Sudan experimented with privatisation and structural reforms in the railway sector.


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THE SUDAN RAILWAYS CORPORATION (SC), THE RAILS THE TIED THE COUNTRY TOGETHER

The Sudan Railways Corporation (SRC) was established in 1956 following Sudan's independence and was structured as a state-owned enterprise under the Ministry of Transport. Its core mandate was to oversee the operation, maintenance, and expansion of the national railway network, which played a vital role in linking the country's regions and facilitating both passenger and freight movement.

The SRC's internal organisation was structured to effectively manage the various dimensions of railway operations. The Operations Department was responsible for train scheduling, routing, and traffic control to ensure service efficiency. There were several internal functional areas:

- The Mechanical Engineering Department handled the maintenance and repair of locomotives and rolling stock, maintaining operational reliability.
- The Civil Engineering Department managed the construction and upkeep of physical infrastructure, including tracks, bridges, and stations.
- The Signalling and Telecommunications Department oversaw the installation and maintenance of communication and control systems essential for safe and coordinated train movements.
- The Finance and Accounts Department administered budgeting, accounting, and financial planning.
- The Human Resources Department was tasked with staff recruitment, training, and welfare.

In addition, a dedicated Security Department was responsible for safeguarding passengers, staff, and railway property across the network.

The SRC's headquarters were located in Atbara, a strategically important city that functioned as the nerve centre of railway operations. It housed major administrative offices and the corporation's primary workshops for heavy repairs.

At its peak, the Sudan Railways Corporation operated one of the largest railway networks in Africa, covering approximately 5,898 kilometres of single-track, narrow-gauge lines (1,067 mm). The main line stretched from Port Sudan on the Red Sea, through Atbara, to the capital city of Khartoum. Branch lines extended to Wadi Halfa in the north, connecting with Egypt; Nyala in the west, serving the Darfur region; and Wau in the south, providing access to what is now South Sudan. These lines were essential for the movement of key commodities such as cotton, gum arabic, and livestock, and also served as critical corridors for long-distance passenger travel.

The SRC maintained a substantial workforce, employing nearly 10,000 people at its height. Its rolling stock included 130 mainline locomotives, 54 shunting locomotives, 4,187 freight wagons, 910 tank wagons, and 167 passenger coaches. Major workshops were based in Atbara, with additional facilities located in Khartoum and Port Sudan.

Over time, the SRC faced growing challenges, including deteriorating infrastructure, increasing competition from road transport, and persistent financial constraints. In response, the government initiated a series of reform measures aimed at revitalising the rail sector. These included encouraging private sector participation in operations and maintenance to boost efficiency, investing in infrastructure upgrades such as track renewal and equipment modernisation, and seeking international partnerships to secure technical support and funding for rehabilitation projects.

These reforms were intended to restore the Sudan Railways Corporation's position as a key pillar of national transportation, capable of contributing to economic development and strengthening regional integration.

The 1990s and early 2000s witnessed near-collapse. The protracted armed conflicts that ran from the early 1980s to around 2005 severely disrupted railway services, particularly on southern and western lines. The route to Wau, in what is now South Sudan, was heavily damaged and ultimately fell out of service. During this period, Sudan experimented with privatisation and structural reforms in the railway sector.

However, these efforts failed to yield meaningful improvement. Service coverage and operational frequency declined to historic lows, and the railway's share of national freight movement fell below 10 percent. Security challenges, particularly in Darfur and along conflict-affected routes, led to sabotage, theft of rails, and attacks on trains. In some regions, entire stretches of track were dismantled for scrap or rendered impassable by neglect.

After the secession of South Sudan in 2011, the country lost access to the southern part of its railway network and, with it, important freight revenue tied to oil and agricultural traffic. The Wau line was severed entirely, and other routes in the south and west were no longer maintained. By this time, the railway had become functionally limited to a few corridors, and the Sudan Railways Corporation was no longer a major national employer or logistics actor.

Nevertheless, there were attempts to revive the railway system from the 2010s onward. Several bilateral discussions were held with foreign partners, including China and Turkey, for track rehabilitation and rolling stock procurement. International donors, such as the World Bank and the United Nations, supported small-scale rehabilitation efforts, particularly on lines used for humanitarian aid. There were also sporadic announcements by the Sudanese government to modernise the Port Sudan–Khartoum corridor, although these rarely progressed beyond the planning phase.

More concrete developments began to emerge in the late 2010s and early 2020s. In 2020, Sudan and Egypt signed an agreement to explore the construction of a standard gauge railway linking Aswan to Wadi Halfa. This proposed project aimed to integrate the Egyptian and Sudanese rail systems, with feasibility studies underway by 2021. Additionally, there were memoranda of understanding signed with Chinese and Russian firms for rail modernisation and freight terminal development. However, political instability, economic collapse, and renewed violence, including the outbreak of armed conflict in 2023, undermined many of these initiatives.

By the early 2020s, Sudan's railway network remained largely inoperative. Tracks and stations were still in place along major corridors, but most of the infrastructure had fallen into disrepair. Locomotives were obsolete or nonfunctional, workshops lacked parts and skilled staff, and management institutions were underfunded and poorly governed. Despite the network's strategic potential- particularly for freight transport, interregional connectivity, and environmentally sustainable logistics - there was no consistent national plan or investment framework to revitalise the sector, although in 2025 some trains began to move between Port Sudan and Khartoum again.

In summary, from the 1950s to the 2020s, Sudan's railway system transitioned from a model of postcolonial infrastructure leadership to a fractured and underutilised legacy network. While there have been multiple efforts to revive core corridors and explore regional integration, most have been hampered by institutional weakness, financing gaps, and protracted conflict. Nonetheless, the basic right-of-way and infrastructure assets remain and, with sufficient investment and reform, could form the foundation of a modernised, integrated transport system in post-conflict Sudan.

GEZIRA LIGHT RAILWAY, A SOLUTION FIT FOR A TIME & PLACE

The Gezira Light Railway was one of associated rail networks to SRC that was built out separately from the mainline. The constructed primarily to transport cotton and other agricultural products from the fields to ginneries, and subsequently to mainline railway junctions for export, most notably toward Port Sudan. The network predominantly used narrow-gauge tracks, typically 610 mm (2 feet) in width, which were well-suited to agricultural tramway operations. At its height, the railway extended across hundreds of kilometres of both temporary and permanent track, spanning the irrigated cotton fields of the Gezira region. Construction of the system began in the 1920s and expanded significantly as the Gezira Scheme grew under British colonial administration. The railway's rolling stock consisted of small diesel or steam locomotives, which hauled flat wagons loaded with baled cotton.

The Gezira Light Railway operated on a seasonal basis, with peak activity occurring during the cotton harvest and ginning period. It was linked to the broader Sudan Railways network at junctions such as Wad Medani, facilitating the shipment of goods to export terminals like Port Sudan. The network was administered by the Sudan Gezira Board and functioned as a critical component of the region's broader irrigation and agricultural logistics system.

The railway began to decline in the 1960s due to several converging factors. The increasing use of trucks and tractors, enabled by expanding rural road networks, reduced the railway's utility. At the same time, the deterioration of railway equipment and infrastructure made operations more difficult and costly. Changes in the economic structure and policy framework of the Gezira Scheme further diminished the system's viability. By the 1980s, much of the Gezira Light Railway had been dismantled or left abandoned.

Though not comprehensive, these services provided a dependable and cost-effective form of urban. By the late 1970s, the urban passenger rail system began to decline. Several factors contributed to this deterioration. One was the rise of road-based transport, including the spread of private vehicles, minibuses, and informal shared taxis such as amjads and, later, coasters.

These modes proved more flexible and convenient in Khartoum's rapidly expanding urban geography. Another factor was the lack of reinvestment in urban rail infrastructure, as Sudan Railways prioritised long-distance freight operations over short-haul passenger services.

By the 1980s, the local rail services in Khartoum had effectively ceased to operate. Tracks within the city were either repurposed for freight or left to deteriorate. No formal metro or tram services were introduced during this period or afterward, despite occasional references in planning documents or popular memory. What existed during the mid-century decades was a modest but functionally important system of diesel-powered commuter trains operating on adapted railway corridors, which played a transitional role in urban mobility before being supplanted by more flexible, road-based transport systems in the decades that followed.



6.4.1

THE RAILWAYS IN THE 2000s

Between 2000 and the onset of the recent conflict, Sudan undertook several initiatives to revitalise its railway infrastructure and services. These efforts were aimed at restoring the Sudan Railways Corporation (SRC) as a pivotal component of the nation's transportation network and economic development.

In 2021, Sudan announced a comprehensive plan to rehabilitate its railway system with an estimated budget of US$643 million. This initiative sought to modernise the railways, enhance operational



EGYPT, LINKING SUDAN TO THE MEDITERRANEAN COAST

In March 2023, Egypt formally announced plans to extend its high-speed rail network into Sudan, marking a significant step toward regional integration. The proposed extension would connect Abu Simbel in southern Egypt to Wadi Halfa in northern Sudan, spanning approximately 80 kilometres. This segment forms part of Egypt's broader 2,000-kilometre high-speed rail initiative, developed in partnership with Siemens Mobility, which aims to connect over 80 cities and extend to neighbouring countries, including Libya and Sudan.

A feasibility study for the Abu Simbel–Wadi Halfa link is currently under way, supported by US$2.5 million in funding from the Kuwait Fund for Arab Economic Development. The project is envisioned to strengthen transport and trade ties between Egypt and Sudan by facilitating the efficient movement of goods and passengers across the border. Its strategic goal is to foster economic development and greater regional cooperation.

Future progress will depend on the results of the feasibility study, funding commitments, and the broader political and economic environment in both countries.

Earlier, in 2008, Sudan and China entered into an agreement to upgrade the railway line between Khartoum and Port Sudan. The project involved converting the existing track to a dual carriage line that meets international standards, thereby improving the capacity and reliability of this critical corridor.

In 2014, the SRC reintroduced passenger services on the Khartoum North–Atbara route, known as the "Nile Train." This service provided an affordable transportation option for passengers, with key stops including Shendi and Ad-Damir. Despite initial success, the service faced challenges such as poor track conditions and difficulties in sourcing spare parts, leading to its eventual decline.

During this period, Sudan also explored the expansion of its railway network to enhance regional connectivity. Plans included constructing new lines linking Sudan with neighbouring countries such as Uganda, Ethiopia, Chad, the Central African Republic, Kenya, and Egypt. These proposals aimed to position Sudan as a central hub in regional trade and transportation networks.

In 2022, Sudan received a shipment of 21 new locomotives from the Chinese company CRRC Ziyang, as part of a contract for 34 units. This acquisition was expected to significantly enhance the country's rail transport capacity and contribute to economic growth.

These initiatives reflect Sudan's commitment to revitalising its railway sector, despite facing challenges such as economic constraints and infrastructural degradation. The efforts aimed to restore the SRC's role in facilitating trade, improving mobility, and supporting the nation's broader economic objectives.





6.5

SHIFT TO BUS SERVICES & PRIVATE PROVISION:

INTERCITY BUS TRANSPORT & "TOYOTA BOXI" DESERT TRAVEL IN SUDAN

Intercity bus transport in Sudan, along with informal travel across desert routes using Toyota pickup trucks, commonly referred to as "Boxi," represents an essential chapter in the country's transport history. While formal rail transport once dominated long-distance movement, the gradual decline of the railway system from the 1970s onward gave rise to a growing reliance on road/dessert track based transport. This shift was driven by changing demographics, economic liberalisation, war-related disruptions, and the increasing availability of imported vehicles. Together, intercity buses and Toyota Boxis became the backbone of long-distance civilian mobility in Sudan, particularly from the 1980s through to the early 21st century.



6.5.1

RISE OF INTERCITY BUS TRANSPORT IN SUDAN

Sudan's formal intercity bus industry emerged in the post-independence era, gaining momentum in the 1960s and 1970s as the country urbanised and demand for passenger mobility grew beyond what the national railway could provide. The bus industry initially developed through state-supported operators and large transport cooperatives, often run in partnership with local authorities or labour unions. These companies typically operated larger coaches on key routes linking Khartoum to Wad Medani, Kassala, El Obeid, Atbara, Port Sudan, and Nyala.

By the 1980s, Sudanese intercity road transport was dominated by private operators, many of whom were owner-drivers or members of transport unions. Large buses, often manufactured by Mercedes-Benz or Isuzu and imported second-hand from the Gulf or East Asia, were retrofitted for local use and adapted to operate under difficult road conditions. The sector became increasingly decentralised, with multiple companies running overlapping services from informal terminals in major cities, such as the Souq Shaabi and Sharq al-Neel terminals in Khartoum.

The lack of enforced regulation led to varying service quality but also enabled rapid growth. Intercity buses became the default mode of long-distance travel for the majority of Sudanese, especially as the railways declined and air travel remained expensive and inaccessible to most. Buses were the primary means of connecting people to family, trade networks, schools, and services across a vast and often road-insecure landscape.



6.5.2

INFORMAL ROAD TRANSPORT & THE 'TOYOTA BOXI'

As formal bus services expanded in core corridors, a more flexible and informal mode of desert and off-road transport also flourished based around the ubiquitous Toyota pickup truck, known colloquially in Sudan as the 'Toyota Boxi'.

The Boxi typically referring to the Toyota Hilux or Land Cruiser pickup became iconic in Sudan for its durability, ease of maintenance, and adaptability to both human and cargo transport. These vehicles could traverse areas where there were no paved roads or where war and environmental degradation had made formal routes impassable.

Beginning in the 1980s and continuing into the 2000s, the Toyota Boxi played a critical role in long-distance travel across remote and desert regions, particularly in the following areas:

Western Desert (Darfur, Kordofan): Boxis linked El Fasher, Nyala, Geneina, and rural areas with the rest of Sudan, often operating outside formal regulatory frameworks;

Eastern Desert: Informal services connected Red Sea villages and mining areas inland to Port Sudan or Kassala;

Northern and Nubian deserts: Boxis provided vital connections from Dongola and Wadi Halfa to remote desert communities and to Egypt, often via smuggling routes or informal trade tracks.

In these contexts, Toyota pickups carried both passengers and cargo - often in extreme conditions, over hundreds of kilometres of unpaved desert tracks. Passengers would sit on planks or rugs in the open truck bed, exposed to heat, wind, and dust. Boxis were known for their ability to navigate wadi beds, sandy terrain, and seasonal floodplains, and their drivers were skilled in desert navigation, often relying on landmarks, stars, and collective memory rather than formal maps or signage.

While the Boxi culture was partly informal, it became semi-institutionalised through transport collectives and roadside "stations" in rural towns. Fares were negotiated, departure times were flexible, and safety standards were minimal. Yet this system remained vital for mobility, trade, and social cohesion in regions with no other viable transport options.



6.5.3

SOCIAL & ECONOMIC ROLE OF NEW BUS & BOXI SERVICES

Both intercity buses and Toyota Boxis played more than just a logistical role as they were deeply embedded in the social and economic fabric of Sudan. Intercity buses allowed rural-to-urban migration, connected provincial towns to the capital, and enabled seasonal labour flows. The Toyota Boxi, meanwhile, facilitated everything from informal trade and pilgrimage routes to emergency medical transport and family visits in isolated communities.

These transport modes were also central to livelihoods. Thousands of Sudanese were employed as drivers, conductors, ticket sellers, roadside vendors, and vehicle repairmen. In many desert regions, the Boxi served as an economic multipurpose vehicle: a family taxi, freight hauler, ambulance, and school bus.



Khartoum Bus Station

6.5.4

DECLINE OF TRANSPORT SERVICES IN SUDAN & NEW CHALLENGES

By the 2010s and 2020s, intercity bus operations and Boxi travel faced growing challenges. Rising fuel prices, inflation, road insecurity due to conflict, and a decline in public investment in infrastructure all eroded service quality. The Boxi system, in particular, came under scrutiny due to accidents, smuggling concerns, and lack of safety standards.

In urban centres, regulation of bus terminals was introduced, but many rural and desert areas remained dependent on informal systems. Additionally, road improvements in some areas and the partial revival of air travel led to shifts in transport demand.



6.6

HISTORY OF URBAN TRANSPORT IN SUDAN POST INDEPENDENCE

Urban transit in Sudanese cities became an issue as they started to grow beyond the size where most trips could be accomplished by walking and as the railway began to reduce and eliminate its limited urban passenger system.

6.6.1

HISTORY OF TRAMS IN KHARTOUM & OMDURMAN

In the early 20th century, when the population of the twin cities of Khartoum and Omdurman (along with Khartoum North, or Bahri) in Sudan was still small at under 50,000 and most people walked to destinations or used boats to cross the river, a pioneering electric tram system was introduced.

Established during the Anglo-Egyptian colonial period, a tramway was among the first modern urban transit systems in the region. It connected the three cities across the Nile, greatly influencing urban mobility and development.



6.6.2

EARLY TRANSIT:
STEAM TRAMWAYS (EARLY 1900s)

Before the electric trams, Khartoum and Omdurman were served by small steam-powered tramways. The first steam tram line opened in 1904 in Khartoum, running on a 600 mm gauge track and about 3.6 km in length. In 1906 a separate steam tram line was introduced in Omdurman. By 1912, these steam tramways had expanded into a combined network of roughly 21 km of track, nominally connecting Khartoum and Omdurman.

In practice, the two cities were separated by the White Nile with no bridge at that time, so ferry services were used to link the rail lines across the river. The steam trams provided a basic urban transport service for passengers and goods, but they were limited in capacity and required transfers via boat between the cities. As Khartoum grew as a colonial capital in the 1910s –1920s, there was impetus to modernise this system.



6.6.3

ESTABLISHMENT OF THE ELECTRIC TRAMWAY (1920s)

In the mid-1920s, plans were made to upgrade the tram network to electric operation. The Sudan Light and Power Company a British-financed utility firm established in 1925 to develop Sudan's electricity infrastructure took over the tramway operations and spearheaded the conversion to electricity. This involved regauging the tracks to 1,067 mm (3 ft 6 in) and installing overhead electric lines. A key enabler was the construction of permanent river crossings: notably the White Nile Bridge (also called the Omdurman Bridge), built between 1924 and 1926, which for the first time provided a direct rail/road link between Khartoum and Omdurman.

After several years of construction and infrastructure upgrades, the new electric tramway officially opened on January 16, 1928. On that date, the first service ran from Khartoum North (Bahri) to Omdurman via central Khartoum, across the Blue Nile and White Nile bridges. This inauguration marked the tramway as the first electric streetcar system in Sudan, replacing the old steam tram lines, which were closed down upon the electric line's opening. The launch of the electric trams was a significant modernisation step for Khartoum's transport, reflecting both the colonial administration's desire to modernise the city and the practical need for a more efficient transit system.



6.6.4

ROUTES & OPERATIONS OF THE TRAM SYSTEM

At its height, the Khartoum–Omdurman electric tram network was relatively extensive, linking the tri-city metropolitan area. The main line ran from Khartoum North (Bahri) through Khartoum city to Omdurman, crossing the Blue Nile into Khartoum and later the White Nile into Omdurman. This primary route was about 5 miles (~8 km) between Khartoum's city centre and Omdurman's city centre. From the Khartoum side, a branch also ran northeast to the Khartoum North terminus (around 3 miles (~5 km) from central Khartoum).

Within Khartoum city, the tracks formed a loop line (a circular routing of roughly 12 miles in total) that went past the Khartoum Central Station and around the downtown area before rejoining the main line. On the Omdurman side, another short branch extended from Omdurman's central terminus to Abu Rouf, a neighbourhood on the Nile bank. At Abu Rouf, passengers and goods could transfer to a ferry that crossed to Shabat Reach on the opposite bank, the location of the former steam tram terminus, thus maintaining a connection with areas north of the city.

The tram lines were single-track with passing loops at intervals, which was typical for colonial tramways to reduce construction costs. There were depots and maintenance workshops, the main ones being in Khartoum and at Zaptia in Omdurman, to house the rolling stock.

The system operated four principal services: (1) Khartoum Central Station – Omdurman Central, (2) Khartoum Central – Khartoum North, (3) Omdurman Central – Abu Rouf, and (4) an inner "circle" service around Khartoum. The tram's headways (intervals between trams) were on the order of 18 to 30 minutes depending on the line, meaning roughly two to three tram departures per hour on each route during operation.

The tramway was heavily used by the public. In 1948, for example, the system carried nearly 8.9 million passengers over the course of the year (an average of 25,000 people per day), a testament to its role as the backbone of urban transport in Greater Khartoum at mid-century. Trams ran throughout the day, conveying commuters, shoppers, students, and others between the three cities.

In addition to passenger services, the tramway also hauled freight: specialised electric locomotives and flat wagons moved about 12,000 tons of goods per year by the late 1940s. This freight service was important for shuttling cargo (such as produce and building materials) from the main railway station in Khartoum to markets and industrial areas, especially in Omdurman, which was a major commercial centre. The ability to move both people and goods efficiently gave the tram system a central place in the economic life of the capital.

Notably, the tram service was stratified by class, reflecting the social structure of the time. Early tramcars had divided sections for first, second, and third-class passengers, and even included reserved "harem" compartments for women travelling separately from men. This meant a single tram might have a first-class section and more basic accommodation for others, with the women's compartment providing privacy for women travelling alone. Despite this social segregation onboard, the tramway was a unifying presence in the city and residents of various backgrounds all relied on it for daily mobility.



6.6.5

ROLLING STOCK & TRAM VEHICLES

The electric tramway was built to a 1,067 mm gauge (3 ft 6 in), a broader track than the old 600 mm steam trams, necessitating complete reconstruction of the lines. Power was supplied via overhead electric wires. The system likely drew electricity from Khartoum's diesel-powered generators (the city's first power station was established in 1908), managed by Sudan Light and Power Co., ensuring a reliable current for the trams. Initially, because of Khartoum's very dry soil, engineers were concerned about achieving proper grounding for the return electrical circuit; however, it was eventually found feasible to use the standard method of a single overhead wire with the rails serving as the return circuit.

EARLY FLEET (1928 -1940S)

When the electric tramway opened in 1928, a new fleet of tramcars had been imported from Britain. These early vehicles were single-deck, two-axle motor tramcars (often called "single-truck" cars) built by the English Electric Company. They typically operated with 4-wheel trailers attached, effectively forming two-car tram sets. The first trams were modest in size and had open sides or open windows, an adaptation to the hot climate. They were painted in a dark livery of dark green with a distinctive tusked elephant emblem on the side of later units.

The interior layout was sectioned to accommodate the aforementioned classes, for instance, a screened-off "harem" section for women and bench seating for third-class riders. Despite their small size, these tramcars were robust, with metal framing and metal seats, chosen to withstand termites and insects that often damaged wooden fittings in the tropics. By 1950, the tram company roster included 16 motor tramcars and 15 trailers in operation, along with a few work locomotives and about 30 goods wagons. All the rolling stock in this period was supplied by English Electric and built to the tramway's narrow-gauge specifications.

UPGRADED TRAMS IN THE 1950S

After World War II, increasing population and military traffic in Khartoum put pressure on the ageing tram fleet. In response, the Sudan Light & Power Co. ordered a batch of new tramcars in the early 1950s to modernise the system. The contract was handled by English Electric, but the tramcars were actually constructed by Charles Roberts & Co. of Wakefield, England, the same firm involved in building Blackpool's famous trams around that time. A total of 10 double-ended motor trams and nine matching trailers were delivered to Khartoum in the early 1950s under this order.

These new trams were bogie cars (each tramcar had two four-wheel bogies, unlike the single-axle trucks of the older trams), allowing for a larger capacity and smoother ride. Charles Robert's designers actually modelled the body style on Blackpool's then-modern double-deck trams, but for Khartoum they produced single-deck cars with some unique adaptations. The cars featured air brakes and electrical couplers so that a motor car could pull a trailer in multiple-unit operation, which was a relatively advanced feature at the time. When these trams arrived, they came painted in dark green and emblazoned with a large white elephant logo on the sides, giving the Khartoum tram a distinctive appearance on the streets.

The introduction of the post-war tramcars around 1952 greatly improved service. Riders noted the updated trams were smoother and more comfortable (the all-metal construction reduced maintenance issues). These vehicles would serve through the 1950s, alongside some of the older stock, and represented the peak of the tram system's technology before its closure. Unfortunately, none of Khartoum's trams (either the original 1928 cars or the 1950s Roberts cars) were preserved in a museum; they were all eventually scrapped when the system shut down.



6.6.6

TRAM MANAGEMENT & OPERATION AUTHORITIES

Throughout its existence, the Khartoum tramway was operated by the Sudan Light and Power Company Ltd., under franchise from the colonial government. This company was established in 1925 as a public utility enterprise, financed and managed by British entrepreneurs but overseen by the Anglo-Egyptian Sudan government, to develop electric power and related services. The decision to electrify the tramway was in line with the company's formation, as it provided a practical use for electricity in the capital and a steady customer for power supply. In effect, the tramway was a semi-public service: while run by a private company, it was state-regulated and integrated into municipal infrastructure plans. Sudan Light & Power not only ran the trams but also built power stations, installed street lighting, and expanded the electric grid in Khartoum during the 1930s–40s.

From an administrative perspective, the tram system was a colonial project. Senior staff were often British, and policies (like class segregation on trams) reflected colonial governance. Fares and scheduling were coordinated with the Sudan Railway (for example, to connect with train arrivals at Khartoum station).
As Sudan moved towards independence, the status of the operating company changed. By the early 1950s the Sudan Government had acquired all shares of Sudan Light & Power, effectively nationalising it. The tramway thus became property of the Sudanese authorities, administered through the national Electricity & Water Corporation that succeeded the old utility company. Day-to-day operation continued with the same tracks and trams in service.

It's worth noting that no separate municipal transit authority existed in Khartoum at the time. The concept of city-run public transport came later. During the tramway years, colonial officials and the utility company were the primary decision-makers for transit operations. They determined routes, set tariffs, and handled expansions or equipment orders (as seen with the 1950s fleet renewal backed by a UK loan). In summary, the tramway was operated as a public utility service under colonial and later national government oversight, rather than by the city councils of Khartoum or Omdurman.

The establishment of the electric tramway had a transformative impact on urban mobility in Greater Khartoum. Geographically, Khartoum, Omdurman, and Khartoum North are separated by the branches of the Nile, and in the early 20th century each city had developed its own character and functions. The tram provided a vital link between these three urban centres, binding them into a single conurbation. It enabled efficient cross-river travel: for instance, a resident of Omdurman could take a tram to Khartoum's rail station or government quarter in a fraction of the time it would have taken in earlier days.

The tram also connected markets, hospitals, schools, and residential areas along its route, encouraging people's movement and daily commerce between the cities. This connectivity spurred economic activity. Merchants from Omdurman's famous souks could more easily bring goods to Khartoum, and vice versa, using the tram's freight capability and convenient passenger service.

Moreover, the tramway's development was part of the broader colonial modernisation of Khartoum. After the Anglo-Egyptian reconquest in 1898, Khartoum was rebuilt with a modern urban plan (grid layout, broad avenues, etc.). The introduction of trams a few years later fit into this scheme by providing a modern mode of transportation befitting a capital city.

Electrified trams (a rarity in Africa at that time) demonstrated technological advancement and helped implement urban planning objectives. For example, the existence of the tram likely influenced where new homes and institutions were sited so they could be near the tram line for accessibility.

In terms of social impact, while the tram segregated riders by class to some extent, it nevertheless served a broad spectrum of the population. Workers, civil servants, students, and even soldiers utilised the trams. During World War II, with fuel rationing and many British troops stationed in Sudan, the tramway was crucial for moving military personnel and equipment around Khartoum. After the war, as private car ownership was still low, the tram remained the primary means of daily commuting for most citizens who did not live within walking distance of their destination.

The high ridership numbers in the 1940s indicate that the tramway was indispensable in an era when bus services were minimal and taxis scarce and expensive. Women in particular may have found the trams a safer or more acceptable way to travel (given the designated women's compartments) compared to other means. Overall, the electric tram system filled an important public transit void, providing regular, reliable service in an urban environment that lacked any other mass transit. It set the stage for the idea of integrated metropolitan transport in Khartoum, a legacy that city planners looked back on decades later when considering new transit projects.



6.6.7

DECLINE & DISCONTINUATION OF THE TRAMWAY

By the late 1950s, the Khartoum tramway faced challenges that ultimately led to its closure. One major factor was the rise of road transport. As Sudan approached and attained independence, investment shifted towards roads and motor vehicles. Buses and trucks became more common in Khartoum, offering more flexible point-to-point travel than fixed rail lines. The state-owned Sudan Light & Power Company began operating bus services as an alternative, and paved roads were improving, which made bus transit more viable. In addition, the population and city footprint were growing beyond the tram lines, meaning many newer neighbourhoods had no tram access and were served by buses or private minibuses.

Another factor was the cost and complexity of maintaining the tram infrastructure. Tracks and bridges required upkeep, and the electrical equipment needed expert attention. By 1960, the original tram cars were over 30 years old (even the "new" 1950s cars were nearing a decade of service by then). Procuring spare parts for a bespoke tram system in Sudan become difficult, and expertise for ram maintenance declined.

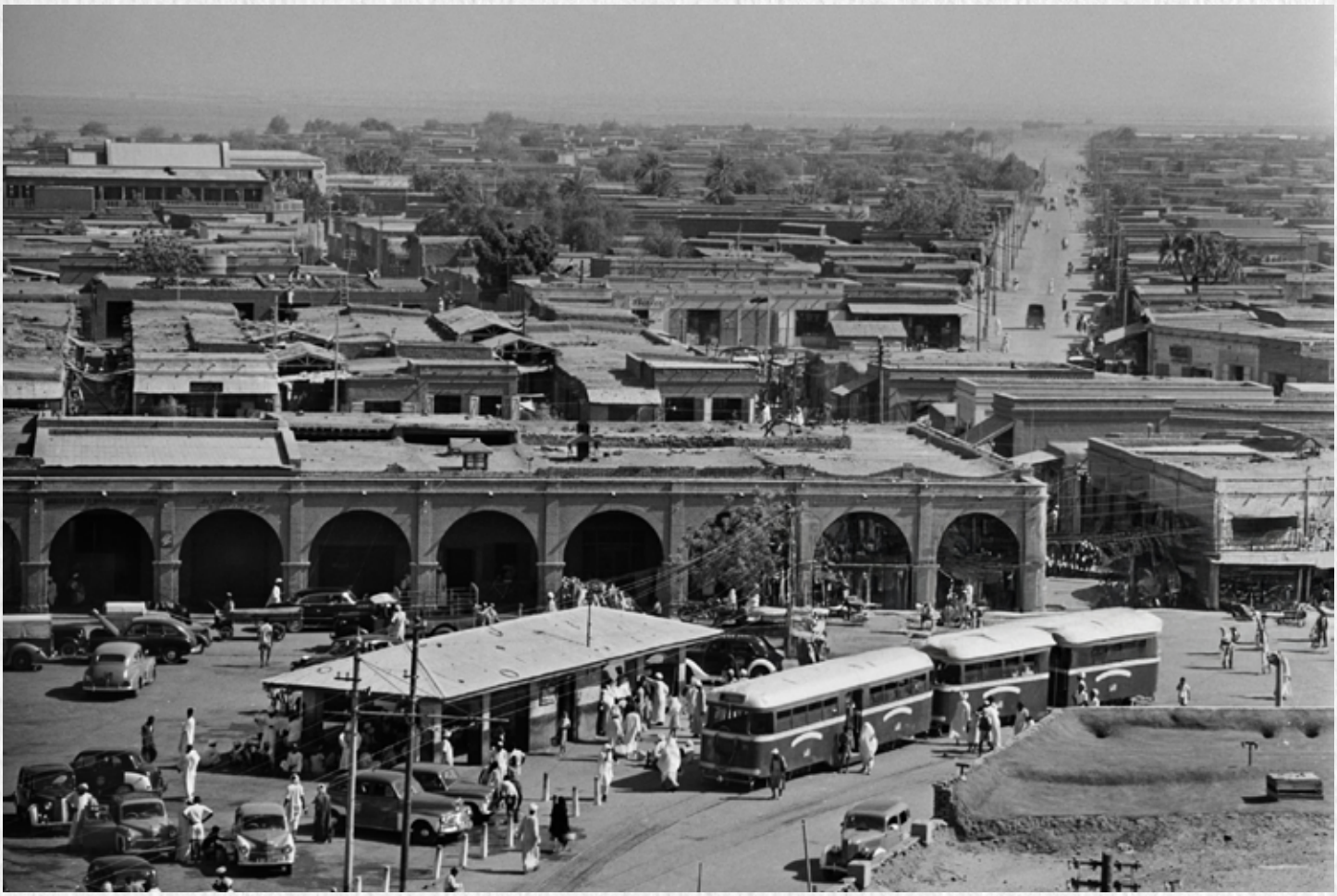


6.7

BUS SYSTEMS IN SUDAN (1950s – PRESENT)

In Sudan (pre-2023), public transit was available throughout the country and while there has been little government investment, the private sector caters to the roughly 75% of trips that are taken by collective transit. In some cases, local authorities try to provide standardized routes and regulate fare or fare policy (like students pay 50% of the fare), but for the most parts the routes follow predictable major thorough fares (where demand) exists and responds to the demand both for routes as well as times.

There is a hierarchy of transport, with smaller vehicles charging higher fares, but effectively running express (all transport or "call-stops' – meaning they pick-up people at any point and drop off riders on request) as they make less stops. In commuting tok-toks provide short and inexpensive connector services for 1-3 people and smaller vehicles and cars run "pool" services for short trips to main transport hubs or main arteries. In larger cities, this essentially has meant that collective transport is available for well over 20 hours a day, albeit at reduced schedules at late or early hours of the and limited routes outside of main travel periods. In rural areas, boxis and haflas usually provide service to communities, but these do not operate on any schedule, although their routes are predictable based on paved or major dessert tracks.



6.7.1 KHARTOUM: *THE NEW CAPITAL*

Originally operated by government and union-affiliated cooperatives, Khartoum's bus network began to grow in the 1950s and 1960s. Large buses serviced fixed routes connecting the city's major residential and market districts. These services were regulated and affordable, forming the backbone of working-class mobility.

During the 1970s and 1980s, formal bus systems began to collapse due to economic liberalisation, vehicle shortages, and maintenance issues. This vacuum was filled by private minibuses (coasters), shared taxis, and informal operators, who continue to dominate Khartoum's transit system today.

By the 1990s, nearly all public transit in the capital had become informal, fragmented, and privately operated, with loose or no regulation. Today the city has no dedicated transit lanes, terminals are overcrowded and chaotic and passengers face long waits, high costs, and limited reliability. See the beginning of this section for description on how the service works.

6.7.2 ATBARA: *THE RAILWAY CITY*

Atbara, historically known as the "railway capital" of Sudan (as well as being one of the 3 second largest cities in Sudan) developed a distinct transport profile centred on its role as the headquarters of the Sudan Railways Corporation. Public transport was historically integrated with railway labour and housing systems. The urban layout was tied to the railway workshops, and many workers commuted on foot or by shared taxi.

There was no tram system but short-distance rail spurs connected different parts of the industrial and administrative zones. These were for freight and operational movement, not public passengers and offered limited services for railway employees.

Bus and minibus services emerged in the 1970s, operating on a small scale due to the city's size. Most transport today relies on rickshaws, microbuses and shared cars as in other cities. Atbara's identity remains tied to its rail heritage, but no formal urban transit infrastructure exists beyond basic road-based services.

6.7.3 PORT SUDAN: *RED SEA GATEWAY*

Port Sudan, the country's primary port and a regional economic centre, has had an evolving but underdeveloped public transit system. Public transport was shaped by its industrial port economy, with high demand for short trips between dockyards, markets, and worker housing areas.

From the 1950s onward, buses and minibuses became the dominant mode of urban mobility. In the 1980s and 1990s, services became increasingly informal, and private operators using minibuses, tuk-tuks, and shared taxis became ubiquitous. Seasonal population increases (due to port employment and migration) frequently overwhelmed the capacity of the informal transit system.

Port Sudan's roads are narrow, congested, and poorly maintained, which further limits the efficiency of public transport. The lack of coordinated service planning, fixed schedules, or real-time passenger information has made public transit costly, unreliable, and poorly integrated as in other cities.



6.7.4 PUBLIC TRANSIT IN SECONDARY SUDANESE CITIES: *WAD MADANI, DONGOLA, KASSALA, EL OBEID, & NYALA*

In other Sudanese regional cities, urban public transit has developed in line with city size, economic base, and road infrastructure. In all cases, public transport has remained road-based, informal, and largely unregulated since the 1980s.

In Wad Madani, minibuses and shared taxis connect neighbourhoods with markets and administrative centres. The city has no fixed-route formal bus operator, and fares are negotiated or loosely set by local union conventions.

Kassala, Dongola and El Obeid, all major regional centres developed limited formal bus services in the 1960s and 1970s, often linked to agricultural cooperatives. As in other cities, these systems were replaced by private operators and informal services after the liberalisation of the economy in the 1980s.

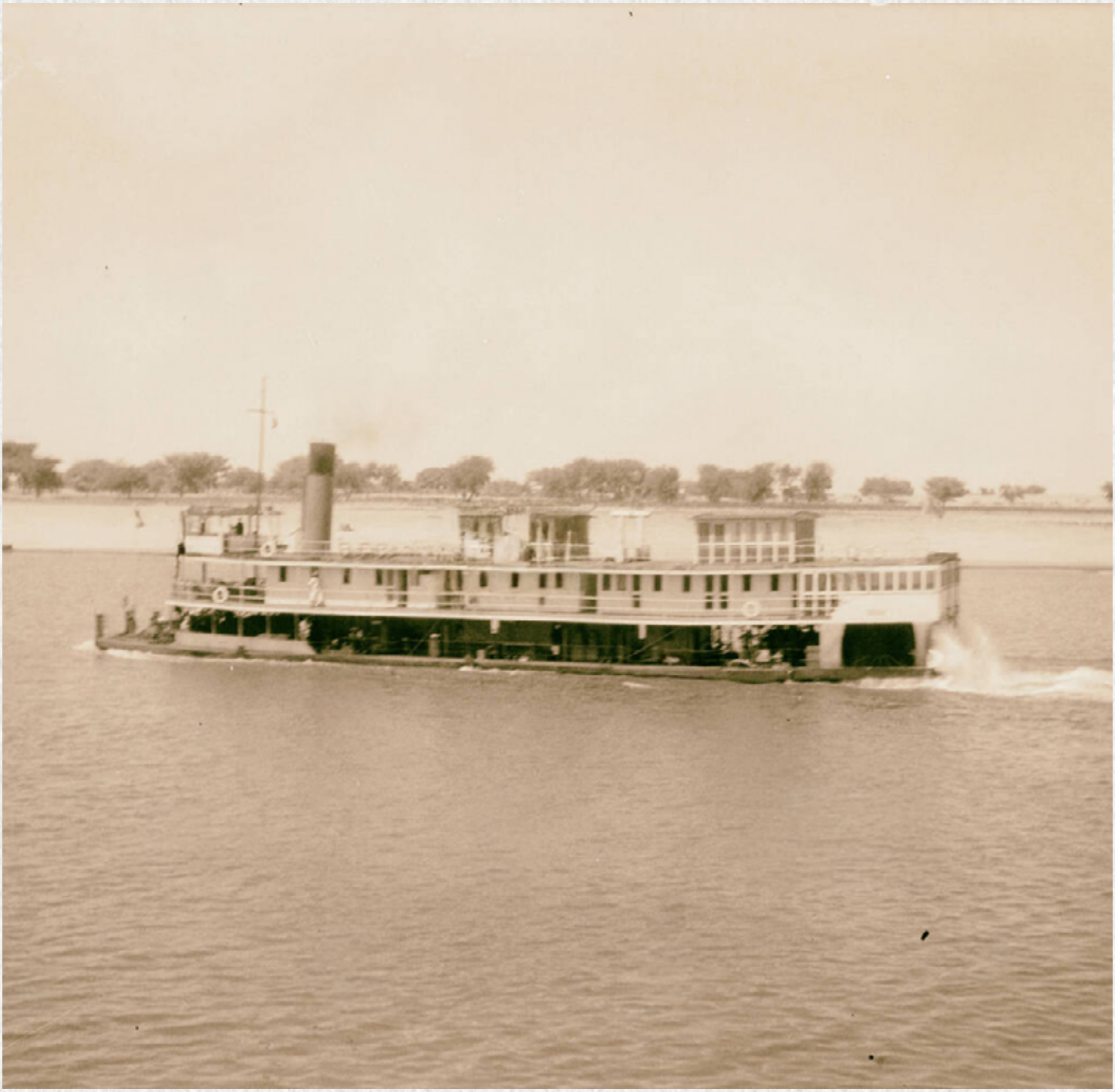
In Nyala and other western cities, public transport was further hampered by conflict and insecurity. Transport often relies on Toyota pickups, motorcycle taxis, and seasonal minibus services. The absence of planning or investment has left these systems fragile and inconsistent.

The history of public transit in Sudanese cities reflects a trajectory from colonial and post-independence formal systems (trams, buses, and limited rail) to a highly informal, privately dominated, and under-regulated model that persists today. While Khartoum once had a functioning tram network and formal bus systems operated in several cities, these collapsed under the weight of economic hardship, war, and state withdrawal from service provision.

Today, Sudan's urban transit is defined by informality, congestion, and cost burden on households. Despite the essential role of these systems in supporting daily life and economic survival, no city currently operates a structured, regulated, or subsidised public transit system. With urban populations continuing to grow and formal employment depending on city mobility, public transit reform remains a critical and yet unmet challenge for urban development in Sudan.

6.8 PONTOONS & RIVER TRANSPORT

Over the years the government operated many different kinds of boats to provide short crossings and longer trips for both goods and people. These boats were critical transportation links in the years before good roads and an bridges were built, especially for heavy items, crossing the river and in areas which were not touched by the railroads.



6.8.1

MAIL STEAMERS

During the Anglo-Egyptian Condominium period (1899 –1956), the Sudanese government operated a fleet of mail steamships along the Nile River. These vessels were integral to the transportation of mail, passengers, and cargo, especially in areas lacking developed road or rail infrastructure.

The mail steamer service in Sudan was established to enhance communication and administrative efficiency across the vast territory that had a limited rail and road network. The steamships facilitated the movement of official correspondence, goods, and personnel between key locations along the Nile River. The service was particularly vital in connecting remote regions to administrative centres, thereby supporting governance and economic activities.

Several steamships were commissioned for the mail service, often constructed in British shipyards and transported in sections to Sudan for assembly. One prominent example is the SS Sudan, built in 1885 for the Egyptian royal family and later repurposed for passenger and mail services. It was part of a broader fleet that included vessels like the SS Arabia and the SS Egypt, which were instrumental in maintaining regular services along the Nile.

The mail steamers operated on scheduled routes, stopping at various ports and settlements along the Nile. These routes connected major cities such as Khartoum - Omdurman and Dongola to Meroe, as well as smaller communities along the way. The steamers were equipped to handle both mail and passengers, providing a reliable means of transportation in a region where alternative options were limited. They would run, weekly, bi-weekly or fortnightly in rural areas.

Travelling aboard these steamships offered passengers a unique experience. The vessels were designed to provide comfort during long journeys, featuring amenities such as dining saloons, observation decks, and private cabins. Passengers could enjoy the scenic views of the Nile, making the journey not only a means of transportation but also a leisurely voyage.

With the advent of modern transportation infrastructure, including railways and roads, the reliance on mail steamers gradually declined. By the mid - 20th century, many of these vessels were decommissioned or repurposed. However, their contribution to Sudan's communication and transportation networks remains a significant chapter in the country's history.

After Sudan gained independence in 1956, the operation of mail steamships along the Nile transitioned from colonial administration to national control. Initially, these services were managed by the Sudan Railways Corporation (SRC), which oversaw both rail and river transport. The SRC maintained and operated the steamship fleet, ensuring the continuation of mail service and passenger services that were vital for connecting various regions of the country.

In 1973, a significant restructuring occurred with the establishment of the River Transport Corporation (RTC), a government-owned entity dedicated specifically to inland waterway services.

The RTC took over the responsibilities from the SRC, focusing on enhancing river transport efficiency and expanding services to meet the growing demands of the population. The RTC operated until 2007, during which time it played a crucial role in maintaining the legacy of mail and passenger steamship services on the Nile.

Post - 2007, the RTC was privatised, leading to the emergence of private companies such as the Nile River Transport Corporation and the Sudan River Transport Corporation. These entities continued to provide river transport services, albeit with varying degrees of success and coverage. The privatisation aimed to improve service quality and operational efficiency, though challenges remained due to infrastructure limitations and seasonal navigability issues on the Nile.

Throughout these transitions, the mail steamship services remained a vital component of Sudan's transportation network, especially in regions where alternative modes of transport were limited. The evolution from colonial to national and eventually private management reflects the broader changes in Sudan's approach to infrastructure and public service delivery over the decades.



6.9 HISTORICAL PORT & INLAND PORT DEVELOPMENT IN SUDAN



6.9.1

PORT SUDAN: *EVOLUTION FROM 1905 TO THE PRESENT*

Port Sudan was established in 1905 by the British colonial administration to replace Suakin, an older port that had become increasingly inadequate due to its shallow waters and limited infrastructure. Located on the Red Sea, Port Sudan was built as a deep-water port capable of accommodating larger steamships, and it was directly linked to the Sudanese interior by the Sudan Railways, particularly the Khartoum–Atbara–Port Sudan line, making it the country's principal maritime and commercial gateway.

EARLY AND MID-20TH CENTURY DEVELOPMENT

Throughout the early 20th century, Port Sudan's infrastructure was gradually expanded. Docks and warehouses were built to handle exports like cotton, gum arabic, groundnuts, sesame, hides, and livestock, and the port played a central role in integrating Sudan into the global commodity trade. Its growth was closely tied to the colonial economy, especially the Gezira Scheme, which boosted cotton production for export through the port.

After Sudan gained independence in 1956, Port Sudan retained its role as the country's primary port. However, despite being a key national asset, the port suffered from underinvestment, inefficient management, and increasing congestion.

From the 1960s through the 1990s, Sudan's broader economic stagnation and infrastructure neglect were reflected in the port's declining performance. The facilities became outdated, equipment maintenance was inconsistent, and port turnaround times were increasingly delayed. The collapse of rail infrastructure further strained port logistics, shifting much of the freight burden to road transport.

LATE 20TH TO EARLY 21ST CENTURY: ATTEMPTS AT MODERNISATION

By the 2000s, Port Sudan handled more than 90% of Sudan's international trade, but it faced growing challenges, including limited capacity, outdated cargo-handling equipment, labour disputes, and logistical bottlenecks. In response, the government introduced phased modernisation efforts, some through partnerships with foreign firms.

In 2009, the container terminal at Port Sudan was partially privatised, with operational control granted to the Philippines-based International Container Terminal Services Inc. (ICTSI), which undertook the introduction of modern container-handling cranes and digital port systems. These measures modestly improved efficiency, especially in containerised cargo, although much of the bulk and general cargo infrastructure remained outdated.

Throughout the 2010s, Sudan pursued discussions with Gulf and Asian investors to expand capacity and improve port governance. However, investment was hampered by Sudan's ongoing economic instability, U.S. sanctions (which made it difficult to access spare parts and capital equipment), and political uncertainty. Despite these constraints, cargo volumes steadily increased, particularly oil exports during the period before South Sudan's secession in 2011.

ABU AMAMA PORT PROJECT AND RED SEA CORRIDOR VISION

A transformative initiative emerged in December 2022, when Sudan signed a preliminary US$6 billion agreement with the United Arab Emirates' AD Ports Group and Invictus Investment to construct a new port at Abu Amama, roughly 200 km north of Port Sudan. This project includes:

- A deep-water port facility;
- An adjacent economic zone with warehousing, processing, and industrial activities;
- An international airport;
- A 450 km road linking the port to Abu Hamad in River Nile State;
- Over 400,000 acres of agricultural development tied to port logistics.

The Abu Amama project was designed not only to expand maritime capacity, but also to shift Sudan's logistics model towards multi-modal, export-oriented infrastructure, similar to the Jebel Ali model in Dubai. Due to the UAE support of the Rapid Response forces, the deal was put on hold and is unlikely to proceed without a major turn of events.

CURRENT STATUS AND OPERATIONAL CHALLENGES

Today, Port Sudan remains Sudan's main international port, handling most of the country's imports of fuel, wheat, vehicles, construction materials, and consumer goods, as well as exports of livestock, sesame, gum arabic, and other agricultural commodities. Despite its strategic importance, the port faces significant operational challenges:

- Labour strikes and protests have periodically disrupted operations, particularly in response to privatisation efforts;
- Political instability, including the outbreak of conflict in 2023, has strained port management and caused slowdowns in customs clearance and cargo handling;
- Congestion remains a problem, with ships sometimes waiting days or weeks to berth, especially during periods of peak demand.

Efforts to improve efficiency are ongoing, and the port is still viewed as critical to Sudan's economic recovery and trade connectivity. Its future, however, depends on sustained investment, political stability, and the successful implementation of complementary projects like Abu Amama and inland logistics corridors.



6.9.2 HISTORICAL CONTEXT & EXISTING FRAMEWORK

Sudan's maritime infrastructure was historically managed by the Sea Ports Corporation (SPC), a state-owned enterprise established in 1974. The SPC was responsible for the governance, construction, and maintenance of the country's ports, harbours, and navigational aids. While it played a foundational role during its early years, the SPC became increasingly bureaucratic and under-resourced, suffering from outdated equipment, limited managerial autonomy, and inconsistent investment.

KEY PORT FACILITIES UNDER SPC MANAGEMENT INCLUDED:

- **Port Sudan:** The country's main commercial hub, comprising the Northern Port (petroleum products, containers, and grain), the Southern Port (edible oils, molasses, and cement), and Green Harbor (dry bulk cargo and container traffic);
- **Al Khair Petroleum Terminal:** Developed in 2003, this facility specialises in oil and petroleum handling and is strategically vital for Sudan's exports and fuel imports;
- **Osman Digna Port (Suakin):** Primarily used for passenger and livestock export traffic to Saudi Arabia, this port also includes a liquefied petroleum gas (LPG) terminal and is essential for regional commerce and Hajj traffic;
- **El Zubir Port (Wadi Halfa):** Serving northern Sudan, this port connects to the Nile River and Lake Nasser transport routes, supporting trade links with Egypt.

Despite this existing infrastructure, Sudan's port system has long suffered from bottlenecks caused by poor container handling efficiency, limited dredging capacity, inadequate intermodal connections (especially rail and inland ports), and slow customs clearance processes. These inefficiencies have eroded competitiveness, increased costs, and discouraged long-term investment.

Compounding these structural challenges is the current situation: both the Ministry of Transport and the SPC have experienced significant capacity loss, especially following the outbreak of conflict in 2023. Staff displacement reduced public revenues, and administrative instability now threaten the continuity of basic port functions. A reformed and autonomous NPA is urgently needed to restructure and revitalise this critical sector.





6.10

INLAND PORT DEVELOPMENT IN KHARTOUM

In addition to investments along the coast, efforts have also been directed towards improving inland transport logistics, particularly in the capital, Khartoum. Although specific project details remain limited, Khartoum's location at the confluence of the Blue Nile and White Nile makes it a strategic hub for inland transport. Plans to enhance river transport and develop logistics facilities in and around the capital are considered essential for increasing the efficiency of cargo movement between Port Sudan and central Sudan.

Furthermore, the road corridor between Khartoum and Port Sudan has been a focus of rehabilitation efforts. The World Bank has supported projects aimed at upgrading this critical national artery, recognising its importance for facilitating both domestic and regional trade. These road improvements are intended to complement the broader logistical upgrades under way and reinforce the connectivity between coastal and inland economic centres.



6.11

THE HISTORY OF THE CONSTRUCTION OF THE NATIONAL ROAD NETWORK

Following Sudan's independence in 1956, the Ministry of Transport prioritised the expansion and modernisation of the nation's road infrastructure. This initiative aimed to enhance connectivity, stimulate economic growth, and integrate remote regions into the national framework.

The 1990s saw continued efforts to expand and rehabilitate the road network, focusing on connecting major cities and improving access to rural areas and an emphasis remained on enhancing transportation infrastructure to support economic activities.

Then between 2000 and 2008, Sudan's road network nearly doubled in length to 6,200 km although the quality of the paved roads constructed was of lower quality due to less of a focus on writing and enforcing good road construction contracts. Due to challenges in the western regions, there was a focus on the construction of roads in Darfur to improve security and access with over 1,125km of roads constructed, which was around one third of all road kilometres constructed in Sudan during th is period. Notable projects include:

- **Zalingei–Al Geneina (178 km)**
- **Nyala–Idd Al Firsan (158 km)**
- **Nyala–Kass–Zalingei (212 km)**
- **Nyala–Buram (136 km)**
- **El Nuhud–El Fashir (441 km)**

During this time Efforts were made to enhance regional connectivity with neighbouring countries including the following roads:

- **Chad:** A 178 km road connecting Addari town on the Chadian border to Al Geneina in Sudan;
- **Egypt:** The New Halfa–Goustol road (22 km) improved access to Egypt;
- **Ethiopia:** The Gadarief–Doka–Gallabat road (145 km) was rehabilitated to facilitate trade;
- **Eritrea:** The Toker–Garora (180 km) and Kassala–Allaffa (26 km) roads enhanced connectivity;
- **South Sudan:** The Al Gableen–Al Renk road (97 km) was completed before 2010;

There was also a focus on using limited resources from oil exports to strengthen core road transport corridors including a newly paved highway from Port Sudan to Atbara, funded by the Kuwait Fund for Arab Economic Development at a cost of US$110 million that reopened in 2009 and reduced travel time by several hours between Port Sudan and Khartoum. The Khartoum–Atbarah–Abu Hamid–Merowe Road known as the "Northern Lifeline" was newly paved and repaired (but only with a thin membrane) and open edby 2011 enhancing connectivity in the northern regions and to the key towns of Merowe with links further north into the Mahas.

While governance and capacity were limited, the The National Roads and Bridges Corporation (NRBC) implemented limited measures to ensure vehicle compliance with axle load regulations by installing new scales and positioning weigh bridges strategically. Road safety auditing was completed for the main corridor of Khartoum–Port Sudan, with recommendations set for implementation, although most were not implemented due to limited funds and capacity.



Roads were already in poor shape pre-conflict.

THE KEY ROAD PROJECTS UNDERTAKEN DURING THE 1950S THROUGH THE 1980.

1950S

Sennar–Damazin Road (1953–1954): This 227 km route was constructed to connect the agricultural regions of Sennar and Damazin, enhancing access to the Blue Nile area and supporting agricultural development.

1960S

During this decade, the government focused on extending road connectivity to remote areas, improving access to markets and services. Emphasis was placed on constructing all-weather roads to ensure year-round transportation.

1970S

- **Khartoum–Port Sudan Highway:** A significant project aimed at improving the link between the capital and the Red Sea port, facilitating trade and movement of goods
- **Gedaref–Port Sudan Section:** This segment of the highway was rehabilitated to enhance transportation efficiency between eastern Sudan and the port

1980S

- **Wad Madani–Sinnar–Kosti Road:** This road was constructed to connect key agricultural and trade centres, facilitating the movement of goods and people
- **Extensions to Umm Rawabah and Al-Obeid:** The paved road network was extended to these towns, further integrating the central regions of Sudan
- **Juba Region Roads:** Several main gravel roads radiating from Juba were improved, including roads to towns southwest of Juba and a road to the Ugandan border. Additionally, a gravel all-weather road east of Juba was built, reaching the Kenyan border and connecting with the Kenyan road system

6.12

AVIATION TRANSPORTATION HISTORY IN SUDAN

Aviation in Sudan traces its origins to the colonial period when the British introduced air transport as part of broader imperial infrastructure development in the early 20th century. The first recorded aircraft landing in Sudan occurred in 1916 during the First World War, when the Royal Flying Corps operated reconnaissance and supply missions in the region as part of the Anglo-Egyptian military presence. Specifically, some of the first use of airplanes was by the British was part of a "Terror" bombing campaign against the forces of Sultan Ali Dinar of the Sultanate of Darfur in 1916, the last fully independent part of Sudan.

By the 1920s, Sudan began to feature as a strategic stopover on early Imperial Airways routes connecting Britain to South Africa and the Indian subcontinent. These initial connections established rudimentary airfields in Khartoum and Port Sudan, laying the groundwork for a national aviation system.

In 1947, Sudan Airways was founded under the Anglo-Egyptian condominium, initially as a government department. The airline began operations in 1949 with a small fleet of de Havilland aircraft, offering domestic service to towns such as El Obeid, Geneina, and Wadi Halfa. Following independence in 1956, Sudan Airways became the national flag carrier and expanded both its fleet and international reach, acquiring larger aircraft and establishing connections with Cairo, Jeddah, and Nairobi. The 1960s and 1970s were a period of relative growth and modernisation in Sudan and resources were available for Sudan Airways to procure and operate aircraft such as the Vickers Viscount and later Boeing 707s. The government also invested in terminal infrastructure, notably at Khartoum International Airport.

Aviation played a critical role in Sudan's internal integration, given the country's vast size and limited overland infrastructure. Domestic flights were essential for linking remote regions, especially during the rainy season when roads became impassable. However, recurrent political instability, coupled with underinvestment and mismanagement, began to affect the sector from the 1980s onward. Sanctions, economic decline, and maintenance challenges degraded the performance of Sudan Airways, whose fleet and service standards fell into steep decline during the 1990s. Despite this, the airline continued to operate with limited international service, and private charter operators began to emerge, primarily for humanitarian work and oil exploration support.

By the early 2000s, Sudan's aviation sector was emblematic of the broader economic and institutional deterioration in the country. While Khartoum remained the central hub, secondary airports struggled with outdated equipment and minimal regulatory oversight. The sector's challenges were compounded by U.S. sanctions, which made it nearly impossible to procure spare parts for Western-built aircraft, forcing reliance on aging Soviet-era planes or grey-market acquisitions. Yet despite these constraints, air transport remained a lifeline for humanitarian agencies, business travellers, and government officials navigating a fragmented and often inaccessible national territory. The groundwork laid in earlier decades, though diminished, continued to shape the contours of Sudanese aviation into the 21st century.

7.0

CURRENT STATE OF TRANSPORT INFRASTRUCTURE IN SUDAN

Sudan's transport infrastructure has emerged from the recent conflict in a state of profound disrepair, compounding decades of underinvestment, poor construction standards, and institutional neglect. The country's road network, which had already suffered from inconsistent engineering quality and a lack of routine maintenance, has been further degraded. Bridges have been damaged, roads rendered impassable, and critical intercity and regional connections disrupted. In many areas, what limited connectivity once existed has been lost, isolating communities from markets, services, and assistance.

The railway system, once a core element of Sudan's transport mix, has been severely affected. Prior to the conflict, Sudan Railways was already operating at reduced capacity due to deteriorated rolling stock, poorly maintained track, and a fragmented network. The recent fighting caused additional degradation, destroying key segments of infrastructure including stations, signalling equipment, and track beds. This has curtailed the movement of goods and people and weakened national and regional supply chains that had depended on rail as a cost-effective transport mode.

Civil aviation infrastructure has also sustained major damage. Khartoum International Airport, the country's principal air gateway, was significantly damaged during the conflict and remains inoperative. Several other airports across the country have also been affected, eliminating critical domestic and international air links at a time when mobility and access to logistical support are urgently needed.



Port infrastructure has fared comparatively better, with Port Sudan still operational. However, it remains outdated and inefficient. Port facilities suffer from ageing equipment, slow cargo handling processes, and limited automation. Given Sudan's heavy reliance on imports and its potential in export markets, these inefficiencies represent a major economic constraint. Delays and costs associated with maritime logistics are borne by consumers and businesses alike, undermining competitiveness and economic recovery.

Urban public transit, once provided through a mix of government-run and private-sector services, has largely collapsed. Today, transit options in most cities and towns are minimal to non-existent. This absence restricts daily mobility, limits access to employment and essential services, and places a disproportionate burden on the poor.

Compounding the deterioration of physical infrastructure is the loss of human capital and institutional capacity. Government agencies responsible for planning, maintaining, and regulating transport systems have been severely disrupted. Many skilled professionals have left the country or are no longer active in the public sector. Rebuilding these institutions and restoring the technical and managerial expertise needed to guide infrastructure recovery will be as important as the physical reconstruction itself.

Rebuilding Sudan's transport infrastructure is essential not only to restoring basic functionality, but also to enabling inclusive growth, improving service delivery, and laying the groundwork for long-term economic resilience.



7.1

THE ROAD NETWORKTHE CURRENT STATE OF SUDAN'S ROAD NETWORK

Sudan's road network, once a critical foundation for economic integration and national connectivity, has entered a state of profound crisis. Years of neglect, inadequate maintenance, and chronic underinvestment had already weakened the system significantly before the outbreak of the most recent armed conflict.

The war that erupted in 2023 has further accelerated the collapse of road infrastructure across the country. The result is a transport network that no longer functions reliably and is incapable of supporting the basic mobility, trade, and service delivery needs of the population.

Bridges across the country have suffered some of the most severe damage. Many were already structurally compromised due to age, weathering, and insufficient repair. During the conflict, critical bridges were targeted or destroyed by artillery fire, explosions, or sabotage. Others were swept away by seasonal floods due to the absence of routine maintenance and drainage management.

In several regions, river crossings that once connected local economies and linked strategic corridors have become impassable, effectively severing access between states and cutting off large population centres from national supply routes.

Even before the conflict, much of Sudan's road network consisted of unpaved surfaces, particularly in rural and peripheral areas. These earth and gravel roads frequently became unusable during the rainy season, isolating entire communities and disrupting agricultural production and trade.

Transporting food, fuel, and essential goods to these regions was more costly and less reliable than in urban areas, contributing to inflation and limiting economic opportunity. Public transit options, where they existed at all, were irregular and expensive to operate. The lack of reliable road access undermined access to education, health care, and social services, particularly in regions that were already underserved.

The war has deepened these vulnerabilities. Transport operators have abandoned routes, fuel shortages have become common, and vehicle fleets have been damaged or repurposed for military use. Where roads have not been physically destroyed, many have been left unmaintained for months, leading to further erosion, silt buildup, and loss of structure. In some cases, informal roadblocks and checkpoints now control access to entire districts, severely limiting movement and contributing to insecurity.

The road network is now central not only to Sudan's recovery but to its survival. It is essential for re-establishing trade between rural producers and urban markets, for ensuring food security, and for restoring the reach of humanitarian assistance and government services. Without immediate emergency repairs and a national plan for reconstruction and connectivity, the isolation, food scarcity, and economic hardship already affecting millions of Sudanese people will deepen. Rebuilding the road system must be treated as a core priority of post-conflict recovery and state rebuilding.



7.2 THE NATIONAL RAIL NETWORK

Sudan's railway system remains underused for passenger travel, though it continues to serve freight transportation needs. The railway lines, once a crucial part of the national transport system, are now largely in disrepair. Many of the routes connecting Khartoum to Port Sudan and other regions have deteriorated, and passenger services are sporadic or nonexistent. Sudan's railways continue to serve as an important freight transport network, carrying goods like oil and agricultural products to the ports for export. However, the aging infrastructure and lack of investment limit its effectiveness and potential for expansion.



7.3 PUBLIC TRANSPORT

True public transport in Khartoum is non-existent at present. The bus network that once served the city is no longer operating, and other public transit options such as trams have been abandoned. The city has in recent years (prior to the armed conflict) relied heavily on informal transport services, including shared taxis and minibuses. These services are largely unregulated and do not meet the growing demand for reliable, affordable public transportation, particularly with the recent influx of refugees. Like in Khartoum, there is a lack of formal public transport systems, which exacerbates mobility challenges.

Prior to the outbreak of the most recent conflict in 2023, the licensing and regulation of buses and minibuses in Khartoum was administered through a combination of national and state-level transport authorities. The process reflected Sudan's broader administrative structure, where certain responsibilities were devolved to state governments, while overall regulatory frameworks remained under federal jurisdiction.

Despite the formal system, a significant proportion of minibus operations in Khartoum functioned informally. Unlicensed operators, route duplication, and fare disputes were common. Government efforts to rationalise and modernise public transport, including attempts to introduce large-scale bus systems or BRT-style corridors, faced opposition from entrenched minibus lobbies and often lacked the infrastructure or financial support needed for full implementation.

Prior to the outbreak of the 2023 conflict, the organisation of public transit routes in Khartoum was a hybrid system that combined formal regulatory structures with deeply entrenched informal and semi-formal practices. The public transport system, dominated by privately owned minibuses, larger buses, and shared taxis, was shaped by legacy policies, municipal oversight, and the influence of transport unions and cooperatives.

Many routes were functionally organised by driver or owner associations that operated like de facto unions. These groups controlled access to popular routes and sometimes levied informal fees on members. While this system provided some level of order and collective bargaining, it also created barriers to reform. Attempts by the state to restructure routes or regulate fares often met resistance from these associations, who feared loss of income or operational control.

The absence of a central public transit agency meant that route planning lacked technical coordination. There was no citywide service map, unified fare system, or central dispatching. Routes were shaped by market forces, user demand, and negotiation among operators rather than transport modelling or demographic planning. This resulted in over saturation along profitable corridors and under-service in peripheral or low-income areas.



PILOT INITIATIVES AND REFORM ATTEMPTS

Between 2010 and 2019, several attempts were made to improve route structure and formalise operations, including:

- Pilot BRT feasibility studies (which were not implemented);
- Route rationalisation programmes around key arterial roads;
- Efforts to consolidate informal operators under larger transport companies, including attempts to revive Sudabus and introduce Kassala Transport Company buses in Khartoum.

However, these initiatives were undercut by a lack of funding, weak institutional coordination, and resistance from the minibus sector.

Public transit route organisation in Khartoum prior to the war was a fragmented and informally negotiated system, loosely supervised by state authorities and heavily influenced by transport associations. While efforts were made to formalise the network, persistent institutional weakness, the dominance of private operators, and lack of infrastructure investment prevented the development of a cohesive, reliable, and centrally planned route system.



THE HISTORY OF METRO PROPOSALS FOR KHARTOUM

The History of Metro Proposals for Khartoum
The proposal to build a metro system in Khartoum has been periodically discussed since the early 2000s, emerging as part of broader efforts to modernise the capital's transportation infrastructure and alleviate chronic traffic congestion. Although no metro lines have ever been constructed, the Khartoum Metro Project has appeared in official planning documents, investment brochures, and bilateral cooperation frameworks particularly during the period of Omar al-Bashir and in early discussions under Sudan's transitional government.

During the 2000s and 2010s, Khartoum's rapidly growing population, rising car ownership, and worsening congestion led government officials and urban planners to explore high-capacity mass transit options. The Khartoum State Government, acting through its Ministry of Urban Planning and Infrastructure, began promoting the idea of a metro or light rail network to connect Khartoum, Bahri (Khartoum North), and Omdurman.

Several conceptual studies were commissioned, and by the early 2010s, the idea had been formally included in the state's strategic urban development plans. The proposed network envisioned multiple underground and elevated lines, with key intersections at locations such as Al Souq al Arabi and the Bahri Railway Station. The system was intended to include both radial and circular corridors, forming an integrated urban transit grid.

One of the most concrete developments came in 2012, when the Khartoum State Government signed a memorandum of understanding with the China Railway Engineering Corporation (CREC). The agreement included a feasibility study for a multi-line metro system, with financing potentially provided through Chinese state-backed loans or public–private partnerships.

The proposed first phase would connect Khartoum International Airport to Al Souq al Arabi and Bahri. The full network was planned to include four lines, exceeding 110 kilometres in total length, with a mix of underground, elevated, and at-grade segments. Future extensions were expected to reach areas such as Sharq al-Nil, Omdurman, and Jebel Aulia on the periphery of the capital.

Despite this promising start, the project never advanced beyond the planning stage. A combination of factors, including Sudan's growing external debt, the imposition of international sanctions, and deteriorating economic conditions, prevented the necessary financing from materialising. Additionally, segments of the public and professional community questioned the project's practicality, arguing that the city's basic infrastructure, such as roads, water supply, and power, remained underdeveloped and should be prioritised over a capital-intensive metro.

During Sudan's transitional government period between 2019 and 2021, the metro project was revisited, though with greater scepticism. Some officials saw it as a symbol of previous regimes' unrealistic ambitions. Policy focus shifted toward developing lower-cost, faster-to-deploy solutions, such as Bus Rapid Transit (BRT). Nonetheless, the metro remained part of the long-term transport vision. The Ministry of Infrastructure and Transport, under Engineer Hashim Ibn Auf, acknowledged that metro development could be reconsidered once the city's road network and surface transit systems were stabilized and effectively regulated. Members of the Sudanese diaspora also proposed alternative solutions such as light rail, which they argued would be more compatible with Khartoum's low-density urban layout and constrained fiscal environment.

Following the October 2021 military coup and the outbreak of civil conflict in 2023, the Khartoum Metro Project has effectively disappeared from official discourse. National priorities have shifted to humanitarian access and emergency infrastructure, leaving no space for high-capital development initiatives. Post conflict reconstruction costs will and should take priority over mega-project spending. However, the concept occasionally resurfaces in private sector proposals or investment marketing materials, particularly those aimed at Gulf or Chinese investors.

In summary, the Khartoum Metro was first proposed in the early 2000s and reached its most developed planning stage with the 2012 memorandum of understanding signed with the China Railway Engineering Corporation. The envisioned network would have exceeded 100 kilometres in length, with four lines connecting Khartoum International Airport, the city centre, Bahri, and Omdurman. As of 2024, no construction has taken place and no active financing exists. The main barriers to implementation include high capital costs, weak governance, public debt, political instability, and urban form constraints. In practice, transport planners have shifted toward more viable alternatives, including Bus Rapid Transit, formalized bus networks, and the possibility of light rail in the future.



7.3.1

PUBLIC TRANSIT VEHICLE & OPERATOR REGISTRATION & LICENSING

As the fleets were privatized there was a need to enforce some minimal standards for the private operators. All commercial passenger vehicles, including large buses, minibuses (commonly referred to as "Haflas"), and smaller vans, were required to be registered with the General Directorate of Traffic Police (under the Ministry of Interior).

This registration process included vehicle inspection for roadworthiness, proof of insurance, and payment of relevant registration fees. Vehicles operating within Khartoum State also required a permit from the Khartoum State Ministry of Infrastructure and Transport. While on paper the process was adequate, in practice most vehicles used in public transit were not well maintained and would not have been accepted for use in other North African or Middle Eastern countries. Almost all had little in the way of passenger comforts and in most cases, extra seating was added in in the aisles and elsewhere to maximize passenger capacity regardless of safety norms.

Drivers of commercial passenger vehicles were also required to obtain a commercial driving license, which included additional qualifications beyond that of a standard private licence. The licensing process involved written tests, driving assessments, and a medical examination and driver training schools in Khartoum provided preparation for these exams. Here again, the quality of instruction and assessments were not of the highest standard and drivers' driving often was not up to the standards needed for safe operation of motor vehicles.



7.3.2

ROUTES, ROUTE PERMITS & FRANCHISE BUS OPERATIONS

Minibus and bus operators (in Khartoum and some other cities) needed a route-specific permit or operating licence in some cases, typically issued by the Khartoum State Transport Authority (KSTA) or a relevant municipal authority. These permits allowed operators to run services along specified routes. In some cases, informal associations or cooperatives controlled specific routes, with operators affiliated through union-style memberships. These groups often had significant influence over route management and fare setting, albeit unofficially.

Licensed minibuses and buses were identifiable by distinct colour-coded schemes based on route and vehicle type. For example, minibuses on central Khartoum routes were marked differently from those operating in Omdurman or Bahri. Each licensed vehicle was also required to display its permit number and route identification in Arabic.

Khartoum's route system evolved organically over decades, dating back to colonial-era planning and expanding significantly during the urban growth of the 1970s and 1980s. The city's transit network was primarily radial, with most routes terminating in or passing through central interchange hubs such as Jackson Square (Maidan al-Jackson), al-Souq al-Arabi, Shambat, and al-Kalakla. These nodes served as the city's informal terminals, where passengers transferred between routes linking Khartoum, Bahri (Khartoum North), and Omdurman.

Route organisation was nominally overseen by the Khartoum State Ministry of Infrastructure and Transport and the Khartoum State Transport Authority. These bodies issued route permits to minibus and bus owners. However, in practice, control over specific routes was often exercised by informal associations or route syndicates, loosely structured groups of vehicle owners and drivers who coordinated service patterns, departure intervals, and sometimes fares.

INSPECTION AND COMPLIANCE MONITORING

While formal route permits existed, they were rarely enforced with rigour, and route overlap was common. Drivers often modified their routes dynamically to respond to passenger demand, traffic congestion, or enforcement visibility. This contributed to unpredictability in service and congestion in high-demand corridors.

Vehicles were also subject to periodic inspection, either annually or semi-annually, to ensure compliance with safety and emissions standards. However, enforcement was inconsistent, and many vehicles operated in poor mechanical condition due to weak regulatory capacity and corruption.

7.3.3

TUK-TUKS ROLE IN THE TRANSPORT SYSTEM

Prior to the 2023 conflict, tuk-tuks, also known locally as rickshaws, played an increasingly important role in the urban mobility ecosystem of Khartoum and other major cities in Sudan. Their emergence and widespread use reflected both the limitations of formal public transit services and the flexibility and affordability tuk-tuks offered for short-distance travel, particularly in lower-income and underserved areas. Tuk-tuks primarily served as a last-mile mobility solution and a neighbourhood-level transit mode in Khartoum, Omdurman, and Bahri. Their primary functions included:

- Short-distance point-to-point travel within dense urban neighbourhoods;
- Feeder service to larger minibus or bus corridors, helping passengers reach main roads or transit hubs;
- Substitute transport in peripheral areas where roads were too narrow, damaged, or unpaved for larger vehicles;
- Low-cost transport option for passengers priced out of minibuses or taxis.

Due to the smaller size of tuk-tuks, tuk-tuks could navigate narrow alleyways, unpaved streets, and informal settlements more easily than conventional vehicles. This made them particularly important in informal urban expansions and peripheral districts such as al-Kalakla, Jebel Aulia, and parts of Bahri.

Tuk-tuks were widely used by low- and middle-income residents, including students, market vendors, women commuting within neighbourhoods, and people without access to cars or reliable public transit. Fares were typically negotiated per trip but were more affordable than private taxis and more accessible than overcrowded minibuses, especially for short rides. Their affordability and availability made them a vital mobility option for those in informal employment or living in unplanned settlements.

Tuk-tuks operated largely in the informal sector, without central coordination or integration into the formal transit system. They were not assigned fixed routes, nor were they regulated in terms of fare structure or service standards. Nevertheless, they filled critical gaps left by the underperforming minibus and bus networks.

In certain locations, tuk-tuk drivers formed local associations or cooperatives, which offered some degree of self-regulation, including conflict mediation, queue management at busy pickup points, and informal fare guidelines.

However, legally, tuk-tuks operated in a legal grey area. While some were registered with local transport departments and paid informal taxes or association fees, many operated without formal permits. Authorities occasionally attempted to regulate them by imposing registration requirements, banning their operation in central areas, or enforcing safety standards, but such efforts were often inconsistently applied or poorly enforced.

Policymakers often viewed tuk-tuks as a traffic nuisance or unregulated competitor to larger transit modes, rather than as a legitimate part of the urban transport solution. Despite this, their popularity continued to rise due to the persistent gaps in public mobility options.

Tuk-tuks became a significant source of employment, especially for young men who faced high unemployment rates and limited job opportunities. In many cases, individuals leased or informally financed them through daily rental arrangements or instalment payments. This provided a flexible livelihood, though with precarious income and no labour protections. In the broader informal economy, they were also used to transport goods, especially in markets, helping facilitate small-scale commerce and urban logistics.

While often overlooked, tuk-tuks played a vital, though informal, role in Khartoum's public transport ecosystem. They provided affordable, flexible, and accessible mobility in areas underserved by the formal transit system. While their proliferation raised concerns about traffic congestion, safety, and regulation, their widespread adoption underscored the systemic gaps in public transport and the need for inclusive, multi-modal planning. In any post-conflict transport strategy, tuk-tuks should be recognised not as a problem to eliminate, but as an essential mode to formalise, regulate, and integrate into a broader urban mobility framework.

The service was mostly provided by a private fleet of over 40,000 minibuses known as "Haflas", along with smaller fleets of Amjads (six-seater minivans) and other vehicles that charge more due to making fewer stops and offering faster trips. Tok Toks (three-wheeled motor vehicles imported from India, also known as auto rickshaws) typically provide shorter trips and act as feeders or connectors between routes at lower fares. A small number of large 12-metre buses also operated; these were the cheapest option, though the slowest.

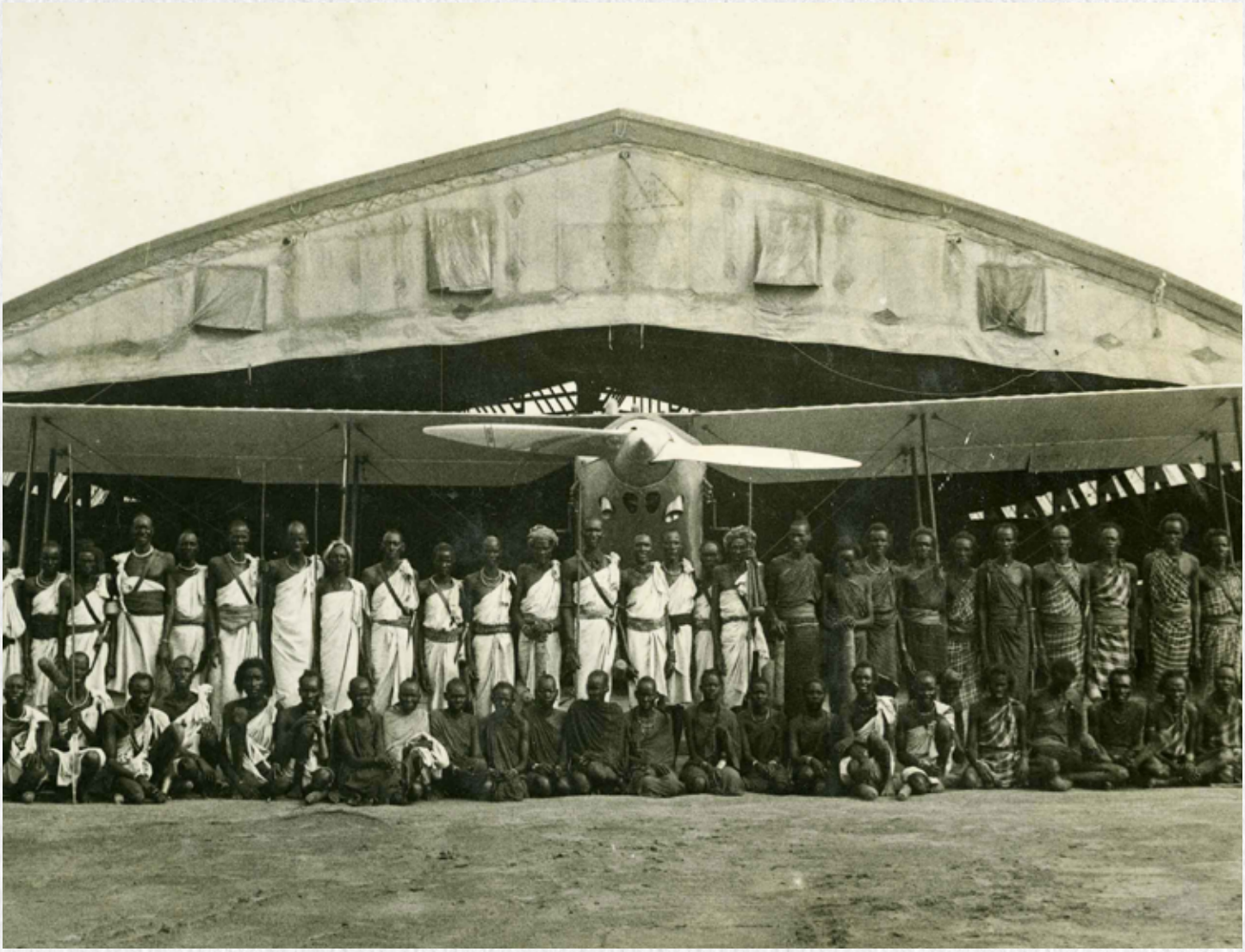
There are no regular stops, but rather all stops are call stops meaning they are requested by the rider (usually in all but the smallest modes there is a person known as a Commissari who collects fares and uses physical (hand signs with different finger alignments indicating different final locations) and vocal means (shouting a version of the final destination (Arabie Arabie or Lefa Lefa) to let passengers know the location. While licenses were issues, vehicle quality was not.



7.4

CURRENT AVIATION INFRASTRUCTURE CONDITIONS

Sudan's airport infrastructure has suffered significant degradation due to years of conflict, neglect, and underinvestment. A comprehensive technical, regulatory, and operational audit is imperative to evaluate the current state of the country's airports. This assessment should prioritise Khartoum International Airport, which requires re-establishment or relocation due to extensive damage. Regional airports in Port Sudan, El Fasher, Nyala, and Kassala necessitate bas ic facility upgrades to restore functionality. Additionally, smaller domestic airstrips, which are vital for humanitarian access and connecting remote areas, must be evaluated to determine their operational status and upgrade requirements.



THE HISTORY OF SUDAN AIRWAYS: FROM NATIONAL DEVELOPMENT TO DECLINE AND REVIVAL ATTEMPTS

Sudan Airways, founded in 1946, is one of Africa's oldest airlines and was historically a symbol of national pride and connectivity. Originally established with British support through the Sudan Railways Corporation, the airline began operations in 1947 with a single de Havilland Dove aircraft. Its early purpose was to connect remote regions of Sudan, serving both administrative and developmental needs in a vast and largely inaccessible country. By the 1950s, Sudan Airways expanded its domestic network and initiated regional services to neighbouring countries such as Egypt, Ethiopia, and Saudi Arabia, supporting trade, pilgrimage traffic, and political integration.

Following Sudan's independence in 1956, Sudan Airways grew as part of broader nation-building efforts. The government invested in expanding the airline's fleet and routes, using aviation to foster national unity across a territory deeply divided by geography and limited infrastructure. Through the 1960s and 1970s, the carrier acquired modern aircraft such as the Fokker F27, Boeing 707, and Boeing 737, enabling it to link Khartoum with major African, Middle Eastern, and European cities. Sudan Airways became a critical tool for economic development, facilitating the movement of goods, people, and services, while also representing Sudan's presence on the international stage.

However, the airline's fortunes began to decline in the late 1970s and 1980s, mirroring the country's broader economic and political instability. Chronic underinvestment, mismanagement, and political interference weakened operations. Maintenance standards fell, fleet renewal lagged, and service reliability deteriorated. International competition further eroded the airline's market share.

By the 1990s, Sudan Airways was heavily impacted by Sudan's international isolation. The U.S. government imposed sanctions in 1997, citing Sudan's alleged support for terrorism, severely restricting the airline's access to spare parts, financing, and new aircraft. These sanctions crippled operational safety and modernisation efforts. Despite some attempts at restructuring, including partial privatisation in the early 2000s, the airline remained burdened by debt, an aging fleet, and deteriorating infrastructure.

The situation worsened after 2010, when continued sanctions and internal conflict further constrained Sudan Airways' ability to operate internationally. The airline faced blacklisting by several aviation authorities due to safety concerns. International routes were slashed, and the carrier became largely confined to unreliable domestic and limited regional services. By the mid-2010s, Sudan Airways was operating a minimal fleet, often relying on leased aircraft and facing frequent operational disruptions.

Efforts to revive Sudan Airways have intensified in recent years. Following the partial lifting of U.S. sanctions in 2017 and Sudan's removal from the U.S. State Sponsors of Terrorism list in 2020, the government initiated new revival plans. These have included seeking international investment, negotiating partnerships with Gulf carriers, and announcing intentions to acquire new aircraft. In 2021, Sudan signed agreements with Airbus and other suppliers to explore fleet renewal, although political instability and economic constraints have delayed substantial progress.

Despite its decline, Sudan Airways remains an important national institution. Its revival is seen as critical not only for restoring national pride, but also for supporting economic recovery by reconnecting Sudan internally and internationally. Whether these revival efforts will succeed depends on broader political stability, investment capacity, and the establishment of a modern, accountable management structure.

7.4.1

CIVIL AVIATION INFRASTRUCTURE

Sudan's civil aviation infrastructure has been significantly impacted by the conflict that erupted in April 2023. Khartoum International Airport, formerly the country's primary international gateway, sustained extensive damage during the early stages of the fighting. Although the Sudanese Armed Forces regained control of the facility in March 2025, the airport remains inoperative due to severe damage to its runways, terminals, and navigation systems, as well as persistent security concerns. In the meantime, Port Sudan New International Airport has become the de facto centre for both governmental operations and humanitarian flights. However, it has also faced disruption, including targeted drone attacks by the Rapid Support Forces (RSF), which have threatened its functionality and reliability as a safe transit corridor.

In response to the destruction in Khartoum, Sudan's Civil Aviation Authority relocated air traffic control operations to Port Sudan, establishing a new air navigation centre to maintain control over national airspace, particularly across the eastern corridor. While this has enabled continued limited coordination of flight paths, the overall management of Sudanese airspace remains constrained.

Beyond these principal airports, Sudan's civil aviation network also includes a number of smaller regional and domestic airports, which have historically played an important role in linking remote areas to larger urban centres. These include airports in El Fasher, Nyala, Dongola, Kassala, Kadugli, Geneina, El Obeid, and Damazin, among others. Many of these facilities, however, are in poor condition, with deteriorated runways, limited lighting and navigational aids, and minimal terminal infrastructure.

In conflict-affected areas such as Darfur and Kordofan, several airfields have suffered from direct damage or remain under the control of non-state actors, further limiting their operability. Where functional, these smaller airports continue to support internal flights, including humanitarian air drops and chartered passenger services, although on an irregular basis. Modernisation efforts at many of these sites had stalled even prior to the recent conflict due to chronic underinvestment, and they will require substantial rehabilitation as part of any post-conflict aviation strategy.



Kassala Airport

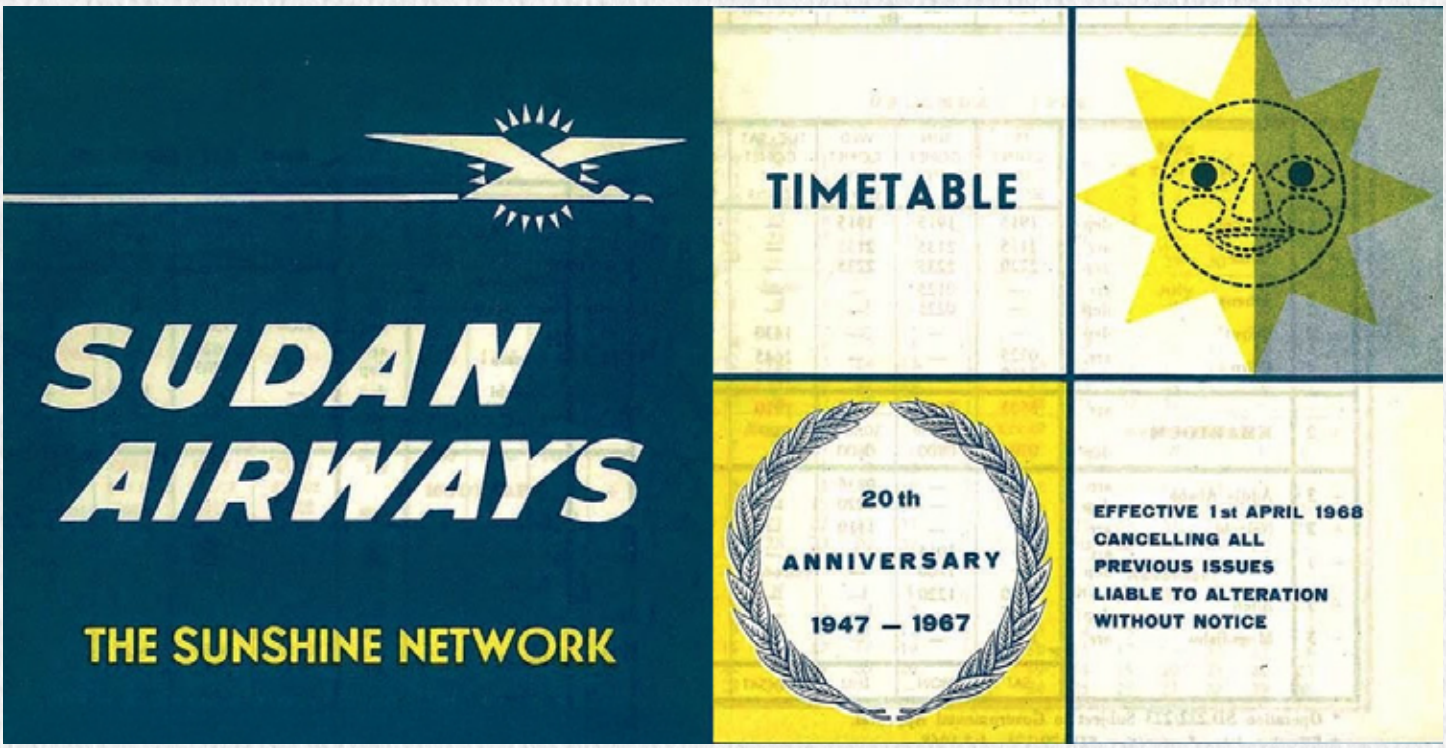
7.4.2

SUDANESE AIRLINES

The airline sector in Sudan remains fragile, with limited international reach and chronic financial and operational instability. Sudan Airways, Africa's third-oldest carrier, has struggled for decades due to poor maintenance, aged aircraft, and managerial challenges. In early 2025, the airline announced plans to modernize its fleet with the acquisition of 15 new aircraft by the end of 2024, a bold move aimed at reviving its presence in the regional and intercontinental markets. However, the viability of this plan remains uncertain given the ongoing conflict and the grounding of major airport infrastructure.

Badr Airlines has emerged as a key operator during the crisis, maintaining a combination of passenger and cargo services both domestically and internationally. It has provided critical support for humanitarian logistics and continues to serve select regional destinations such as Cairo, Jeddah, and Dubai. Tarco Aviation, founded in 2009, offers scheduled flights and charter services across Sudan, the Middle East, and parts of Africa. Its fleet includes Boeing aircraft suited for short- and medium-haul routes, and it remains active in spite of the security and logistical challenges posed by the conflict.

It is worth noting that all Sudanese airlines are currently banned from operating within European Union airspace due to persistent concerns over safety oversight and regulatory compliance.



7.5

ENHANCING CLIMATE & RISK RESILIENCE

AI can also support Sudan's adaptation to climate-related risks and other emergencies. During floods, conflict, or infrastructure failure, AI tools can help identify alternative routes, direct traffic away from hazardous areas, and support the logistics of emergency response. In the longer term, AI can support emission monitoring and carbon accounting in the transport sector. This can inform the design of more sustainable policies, attract climate financing, and enable Sudan to meet international environmental reporting requirements. These capabilities are especially valuable in a country vulnerable to extreme weather and where adaptive planning is critical to development.



7.6

THE ROLE OF ARTIFICIAL INTELLIGENCE IN IMPROVING TRANSPORT SYSTEMS IN SUDAN

Artificial Intelligence (AI) has the potential to revolutionise Sudan's transport sector, especially in a post-conflict context where public resources are scarce, institutions are fragile, and legacy infrastructure is insufficient. AI can serve as a strategic enabler for the Sudanese state, allowing it to overcome traditional capacity constraints and deliver more efficient, equitable, and responsive transport services across roads, ports, airports, and public transit systems.

8.0

PROPOSED SOLUTIONS, ACTIONS & REDEVELOPMENT PLAN

As Sudan emerges from a period of prolonged internal conflict that has reshaped the national landscape in ways that were unimaginable just a few years ago, recovery will be a long and difficult process.

This most recent phase of armed struggle reached parts of the country that had either never experienced direct combat or had not done so in decades, resulting in widespread destruction. While the human toll eclipses any other discussion, the Sudanese people are resilient and will rebuild their country and society, despite the challenges ahead.

Transport infrastructure has been a particular casualty of the violence and its associated desruction with key corridors having been severed, bridges and roads destroyed, railway stations and maintenance depots abandoned or rendered inoperable.

While the physical damage is clear to see and extensive, equally critical has been the collapse of institutional capacity. Many government ministries and agencies, including those responsible for transport and infrastructure, have ceased functioning and their people have been dispersed. Institutions and systems that were already week, were pushed to the breaking point. Years of administrative breakdown, combined with the displacement of civil servants and the loss of institutional memory, have left a vacuum in governance that must now be urgently addressed.

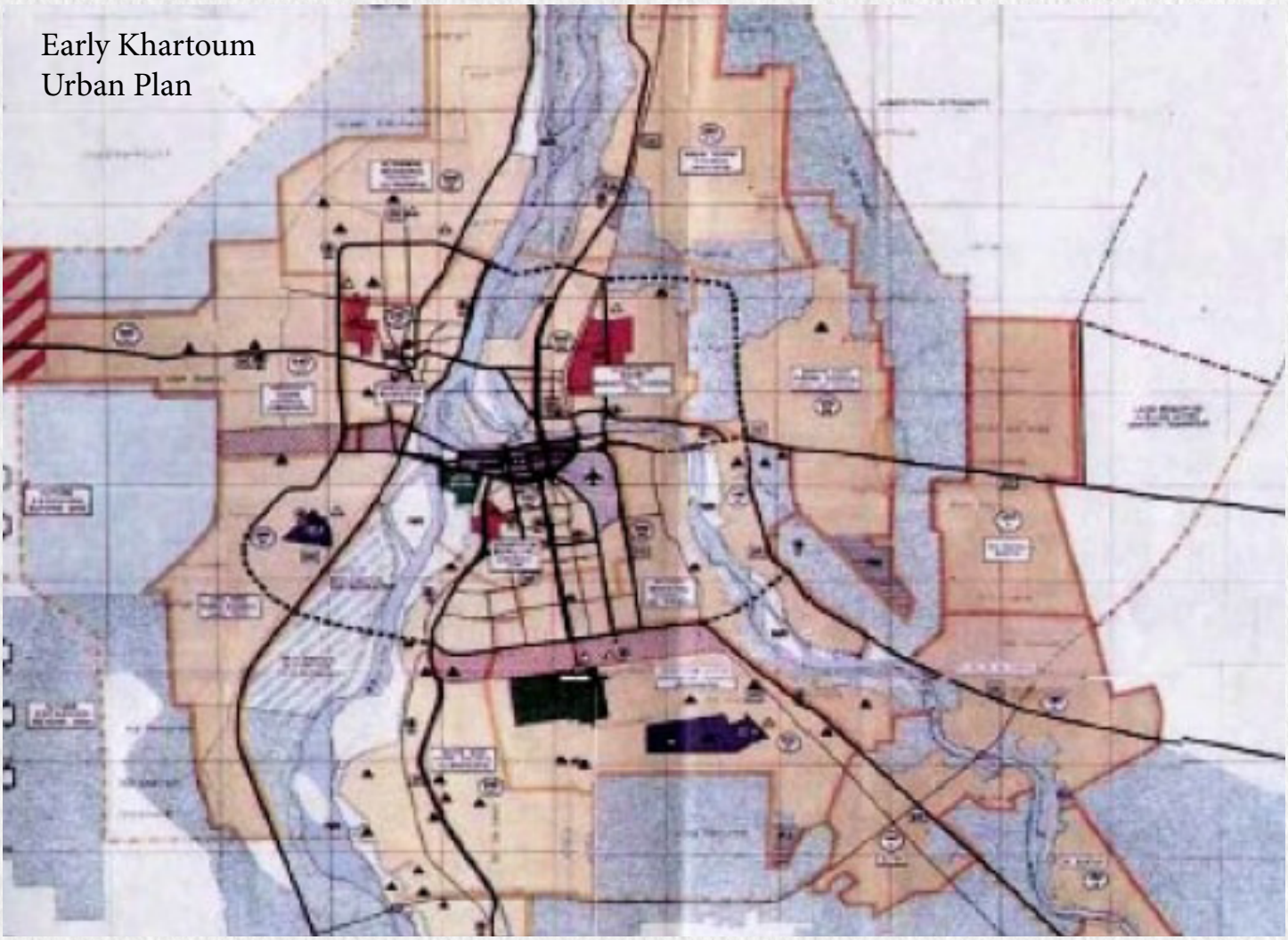
The task ahead is enormous. The reconstitution of functioning government transport departments and agencies is essential not only to provide basic mobility and support the movement of goods and services, but also to lay the foundation for national recovery and cohesion.

While this report takes an optimistic view of the future of Sudan, it is noted that the recovery must be done within the reality of limited financial and human resources. Public institutions will need to be rebuilt from the ground up, recruiting staff, designing systems, re-establishing legal mandates and regulatory frameworks, all while managing the urgent need to restore basic services and connectivity. The scale of the challenge means that pragmatism must be central to every decision: not every road, rail line, or administrative function can be restored at once. Prioritisation, coordination, and disciplined resource allocation will be essential.

At the same time, this moment offers a rare opportunity to think beyond restoration. The collapse of old systems, while deeply damaging, also clears the way for reform. With much of the physical and institutional legacy of the past dismantled, Sudan has the chance to design transport governance systems that are more efficient, transparent, and responsive than those that came before. New digital tools can be adopted to streamline licensing, permitting, and procurement processes. Infrastructure can be rebuilt using more cost-effective and resilient technologies. Institutional frameworks can be restructured to better coordinate national and regional transport planning, reduce bureaucratic fragmentation, and improve service delivery.

Moreover, as communities are rebuilt, often from the ground up, there is scope to integrate modern transport concepts such as bus rapid transit, multimodal hubs, and context-sensitive urban design that facilitates safe, efficient mobility. These possibilities are not abstract ideals; they are pragmatic responses to the scale of reconstruction required. They offer ways to stretch limited budgets while delivering better outcomes, particularly in urban areas that may be rebuilt with a blank slate.

Still, optimism must be tempered with realism. Transport is only one of many urgent national priorities, and funding will inevitably be constrained. Any reform or rebuilding agenda must respect the broader context of national recovery, balancing ambition with the need to deliver tangible, short-term improvements. Rebuilding transport systems and institutions in Sudan will require not just engineering and planning expertise, but a willingness to work iteratively, to build capacity over time, and to focus relentlessly on impact and accountability. The opportunity to reimagine the sector exists, but seizing it will require vision, discipline, and a firm commitment to doing things differently.



Early Khartoum
Urban Plan

8.1

ROAD INFRASTRUCTURE

In the context of Sudan's post-conflict recovery and national reconstruction, the rehabilitation and expansion of the road network stands as an urgent infrastructure priority. With large portions of the country's roadways and bridges either severely deteriorated, unpaved, or seasonally impassable, immediate interventions are needed to restore economic connectivity, enhance access to essential services, and lay the groundwork for long-term mobility and trade.

This strategy should prioritise emergency repairs to critical roads particularly in major urban centres and on strategic intercity corridors such as those linking Khartoum to Port Sudan while simultaneously establishing institutional frameworks and sustainable funding mechanisms for the sector.
A national rapid road condition assessment should be undertaken to generate a prioritised inventory of critical corridors. Emergency repairs in urban areas, strategic reconstruction of inter-city highways, and upgrading of rural connectors must be implemented simultaneously.

Public sector support is essential to provide road construction inputs, including asphalt batching plants, aggregate production, and leasing depots for construction equipment. Modular bridge solutions should be mass-produced to quickly restore access in flood-prone regions.



8.1.2

RAPID NATIONAL ROAD ASSESSMENT & PRIORITY URBAN AND RURAL ROAD IMPROVEMENTS

The first and most immediate step must be a comprehensive, rapid technical assessment of Sudan's entire public road network. This effort should evaluate road surface conditions, traffic volumes, structural integrity of bridges, drainage capacity, and year-round accessibility. Such an assessment would generate a digital asset inventory and condition rating system, enabling planners to prioritise investments based on a combination of strategic national importance, economic return, humanitarian impact, and population served. This database should be centrally maintained and used to support planning, donor coordination, and transparent investment tracking.

Urban areas, particularly Khartoum, Port Sudan and Atbara require immediate investment in resurfacing, junction upgrades, drainage rehabilitation, and pedestrian infrastructure to manage rapid population growth, reduce traffic congestion, and improve road safety. In many cases, the existing paved networks have received little to no maintenance for years, resulting in potholes, surface failure, and hazardous conditions.
Urban mobility improvements must also consider non-motorised users, ensuring sidewalks, crossings, and drainage channels are integrated into road designs.

Rural roads and local connectors are equally critical. Many of these roads remain unpaved, with earth or sand surfaces that become impassable during the rainy season. Targeted low-cost upgrade, such as gravelling, culvert installation, and roadbed regrading, can significantly improve year-round accessibility in areas with limited resources.

These upgrades are especially important in regions with high agricultural potential, where improved rural mobility could facilitate access to markets, reduce post-harvest losses, and stimulate local economies. Similarly, roads serving internally displaced persons (IDP) settlements and host communities must be prioritised to ensure humanitarian aid, health services, and education are accessible.

8.1.3

BUILDING PRIVATE SECTOR CAPACITY THROUGH LIMITING GOVERNMENT INVOLVEMENT & USING A USER PAY MODEL TO BRING AFFORDABLE & SUSTAINABLE IMPROVEMENTS TO COMMUNITIES

Addressing material shortages and cost overruns will require direct public sector intervention in the construction value chain. The government should invest in the strategic development of asphalt batching plants in key locations, the establishment of gravel and aggregate production sites near high-priority corridors, and the procurement of basic road construction equipment for lease to small and medium-sized contractors.

These interventions would not only reduce unit costs but also ensure supply chain reliability and expand the number of kilometres of road that can be constructed or rehabilitated with limited public funds. In fragile and post-conflict environments where private sector investment remains constrained, such targeted public investment is both necessary and justified.

To ensure long-term financial sustainability, Sudan should introduce tolls on selected high-traffic intercity highways and critical bridge crossings, particularly those over the Nile. Tolls should be structured to be transparent, equitable, and ring-fenced for maintenance and upgrading of the tolled facilities. In parallel, the government should implement a modern, national vehicle registration and licensing system.

This system would help regulate vehicle flows, reduce congestion, and generate recurring revenues for transport infrastructure. Additionally, it would enable the creation of a national vehicle database to support road safety enforcement, transportation planning, and eventual emissions tracking.

Finally, the reform of institutional governance in the transport sector is essential to achieve results that are financially accountable and technically sound. Sudan should re-establish a dedicated National Roads Commission or National Roads Authority as an autonomous but publicly accountable body.

This institution would be tasked with planning, financing, and supervising the delivery of all strategic road infrastructure. It should be empowered to manage donor funds, issue tenders, monitor contractor performance, and coordinate across ministries and local authorities. The Commission should operate under performance-based principles, with clear targets for delivery timelines, cost efficiency, and quality control.

REBUILDING SUDAN WITH INNOVATION: ADDRESSING ISOLATION OF COMMUNITIES WITH NEW BRIDGE DESIGN

In areas prone to seasonal flooding, the lack of bridge infrastructure often results in complete isolation of communities for weeks or months. The use of modular bridge systems, such as Bailey-style steel structures or precast concrete spans, provides a cost-effective and rapid deployment option. These bridges should be procured in bulk and standardised for ease of transport and installation. Modular bridges offer the flexibility to be deployed on short notice and relocated as needed, making them well-suited to a recovery context marked by shifting priorities and evolving needs.

As the central coordinating agency for road development, it would play a pivotal role in ensuring Sudan's fragmented and underdeveloped road network is transformed into a national asset capable of supporting economic revival, political integration, and inclusive growth.



8.2

RAIL SYSTEM MODERNISATION

Sudan's railway system, once a backbone of national integration and economic activity, now stands in urgent need of comprehensive modernisation. Years of conflict, neglect, and underinvestment have left vast stretches of the rail network degraded or inoperable. Key freight corridors that once linked production zones to ports and markets have been severed, and many passenger services have ceased entirely. In the aftermath of the recent civil conflict which has caused severe damage to physical assets, disrupted institutional management, and displaced experienced personnel, the need for a clear, strategic approach to rail system reconstruction is more pressing than ever.

A modern rail system will be vital to Sudan's broader post-conflict recovery and economic revitalisation. Rail is uniquely positioned to offer low-cost, high-capacity transport across long distances, reducing the burden on overstretched road networks and enabling the movement of goods and people across regions. In the near term, priority must be placed on rapid and realistic asset evaluation to determine the condition of existing infrastructure, rolling stock, signalling systems, and maintenance facilities. This should be followed by the phased rehabilitation of strategic routes beginning with those corridors that can restore core national and cross-border freight operations and reconnect key urban centres.

However, reconstruction must also be future-focused. This is an opportunity not only to rebuild, but to modernise: to introduce modular and scalable technology, adopt more efficient operational models, and strengthen institutional capacity in rail governance and operations.

The goal is not merely to restore past functionality, but to establish a rail system that supports inclusive economic growth, regional integration, and sustainable development in the years to come. This plan outlines a practical framework for achieving that vision, anchored in Sudan's current realities but driven by a commitment to transformation.

Restore key passenger routes and upgrade the railway infrastructure to handle both freight and passenger services. Focus on increasing the frequency of passenger trains between Khartoum and other key cities, such as Port Sudan and Wad Madani.

RAIL SYSTEM MODERNISATION & THE MAKING OF THE 21ST CENTURY'S SUDAN NATIONAL RAILWAYS

Rebuilding Sudan's railway system is a central pillar in the broader strategy to restore national infrastructure and economic connectivity following years of conflict. A revitalised rail network will not only reduce pressure on deteriorated road infrastructure but also provide a cost-effective, energy-efficient mode of moving freight and passengers across long distances.

Given Sudan's geographic expanse and regional trade potential, a phased and pragmatic approach to rail system modernisation is required, beginning with infrastructure assessment and extending through strategic corridor rehabilitation, innovative financing, and the integration of intermodal logistics.

The new incarnation of the Sudan National Railways will need to look very different to serve the Sudan of the 21st century and since it will require a total rebuild there is the chance to rebuild better and make the new railroad fit for purpose for a modern post-conflict Sudan.

Many sections of the railway have not been maintained in decades, and recent conflict has compounded the degradation of infrastructure.

1. RAPID AND COMPREHENSIVE EVALUATION OF SUDAN RAILWAYS CORPORATION'S ASSETS

The first priority is a rapid and comprehensive evaluation of the Sudan Railroad Corporation's physical and operational assets This assessment and evaluation must include detailed inspections of track conditions across the national network, including structural evaluations of bridges, culverts, and embankments.

Signalling and communication systems, most of which are outdated or non-functional if they have not been destroyed or damaged require inventorying and diagnostic testing.

All rolling stock, including locomotives, freight wagons, and passenger coaches, must be catalogued and assessed for serviceability, repair potential, or decommissioning.

Equally important is a review of maintenance facilities, classification yards, and repair workshops, many of which are now underutilised or in disrepair.

A full inventory and valuation of railway-owned properties including stations, terminals, rights-of-way, and urban land holdings will support both corridor planning and financing mechanisms. This evaluation phase will determine which routes are economically viable for rehabilitation and guide the strategic prioritisation of investment.

2. STRATEGIC ASSET REVIEW & COMMERCIALISATION STUDY FOR SUDAN NATIONAL RAILWAYS

As part of the broader agenda for rail system modernisation in Sudan, a strategic asset review and commercialisation study is essential to guide future decisions on the structure, governance, and potential operational models of Sudan National Railways (SNR). This comprehensive review would provide the analytical and institutional foundation required for assessing whether, and how, parts of the rail system could be better leveraged through alternative delivery models, including private participation, without compromising public ownership of critical infrastructure.

The strategic asset review would involve a detailed mapping and valuation of all SNR assets, including track infrastructure, rights of way, bridges and structures, signalling and communications systems, rolling stock, stations and terminals, maintenance depots, workshops, real estate holdings, and operational equipment. The review would classify assets according to their condition, economic potential, strategic importance, and relevance to the core mission of the railway system. It would also identify underutilised or non-core assets that could be monetised or repurposed to support broader railway development and investment objectives.

Additionally, the review would include an institutional and legal assessment to evaluate the enabling environment for commercialisation or private participation. This would encompass current governance arrangements, the legal status of the SNR entity, existing labour and concession laws, and regulatory capacity within relevant ministries and agencies.

Building on the asset review, the commercialisation study would focus on identifying options for reforming the structure and operations of SNR to improve service delivery, operational performance, and financial sustainability. This could include:

- Establishing clear separation between infrastructure management and service operations.
- Creating financially ring-fenced business units within SNR.
- Evaluating concession or lease models for specific corridors or services.
- Reviewing models for contracting out maintenance, ticketing, or station management.
- Assessing public service obligations for passenger services and the viability of government subsidies.



At the heart of the commercialisation study is the value-for-money (VfM) assessment, which would compare the expected long-term costs and benefits of different delivery models, public, private, or hybrid, for various components of the rail system. The VfM assessment would include:

1. **Financial analysis:** Projecting capital and operating costs under different delivery models, including full public provision, public-private partnerships (e.g., concessions, leases, DBOMs), or full outsourcing

2. **Risk allocation:** Analysing how risks, such as cost overruns, demand fluctuations, operational failure, and maintenance backlogs, would be distributed under each model, and which party is best positioned to manage those risks.

3. **Performance benchmarking:** Comparing potential service levels, reliability, and investment timelines against public sector benchmarks and international experience

4. **Lifecycle costing:** Evaluating total costs over the lifecycle of assets and services, including rehabilitation, maintenance, and end-of-life considerations.

5. **Institutional capacity:** Assessing the government's ability to regulate, contract manage, and oversee PPP or privatised arrangements effectively.

6. **Socioeconomic impacts:** Reviewing impacts on employment, service accessibility, and regional equity, particularly for passenger and rural services.

To complement the VfM assessment, a market sounding exercise would be conducted with potential private operators, investors, rolling stock lessors, and infrastructure developers. This would help identify which segments of the rail system are likely to attract interest, what contractual structures and incentives would be necessary, and what concerns or barriers might limit participation. It would also inform the design of realistic commercial models and mitigate the risk of launching tenders that fail to generate competitive responses.

It is important to emphasise that the core physical assets of Sudan National Railways, including track infrastructure, signalling systems, land corridors, and primary terminals, should remain under state ownership, given their national strategic importance. However, how these assets are operated, maintained, or leveraged commercially can be subject to alternative delivery models. For example, the state may continue to manage priority passenger services directly, while entering into freight concessions or workshop management contracts with experienced third parties.

By integrating strategic asset mapping, rigorous commercial analysis, market engagement, and institutional readiness assessment, this review process will equip the Government of Sudan with a clear, evidence-based path forward for Sudan National Railways. It will allow policymakers to weigh operational and investment options carefully and transparently, ahead of any commitments to reform, restructuring, or partnership agreements, and ensure alignment with long-term public interest, development priorities, and fiscal constraints.



Authors meeting wih Sudan Railway officials to find ways of working together to improve rail operations pre-conflict.

3. DEVELOPING A REHABILITATION PLAN

Based on consultations with government and civil society, keeping in mind other reviews of SNR future operations structures and based on the comprehensive evaluation of assets of the SNR, a National Railways Rehabilitation Plan needs to be developed and costed.

This should be developed within 6 months of the start of the evaluation to seize the moment and tap into redevelopment and reconstruction funds as they become available. However, there are opportunities to develop a redevelopment plan that is partially funded by existing assets and private sector development, assuming that there is a security and sense of stability.

However, the SNR's rebuilding must be based on public need and not only what investors would fund and the SNR must remain owned by the public to act as a tool for national development as it has in the past. Quick sales of assets or full privatization are not in the national long-term interest.

Based on both economic and logistical criteria, the initial focus of network rehabilitation should be on restoring key freight and passenger corridors that serve as the backbone of national connectivity. Three corridors stand out as priority routes:

- **Khartoum – Port Sudan:** This east–west corridor is Sudan's most critical trade artery, connecting the capital to the country's principal seaport. Restoring this route would dramatically improve import-export efficiency and reduce overland freight costs.

- **Khartoum – Wadi Medani:** Serving a major agricultural region, this corridor can facilitate the movement of perishable goods, inputs, and farm labour, strengthening supply chains and supporting rural economic growth.

- **Khartoum – Atbara:** This historically important line once functioned as a core part of the national network and has strong potential for passenger and cargo recovery with limited upgrades.

Passenger services should be restored selectively, based on demand projections, operational cost analyses, and social return on investment. High-volume urban or intercity routes, such as those serving commuter needs between Khartoum and Omdurman or Khartoum and Wadi Medani, may warrant limited urban rail operations using simplified, cost-conscious models.

Given the severe budget constraints facing the state, a cost-conscious implementation strategy is imperative. Used locomotives, railcars, and maintenance equipment should be sourced from international surplus markets as a cost-saving measure. Numerous railway agencies and operators globally retire rolling stock in serviceable condition, often available at a fraction of the cost of new equipment. Sudan should establish procurement partnerships or technical agreements with such entities to secure appropriate assets, with technical support for refurbishment and integration into the local network.



Equally, the reconstruction strategy should allow for flexibility in design and technology. In certain corridors, particularly lower-volume regional lines, lighter track construction, modular bridge designs, and simplified signalling systems may reduce upfront capital costs while preserving operational utility. The question of track gauge also merits careful consideration. While Sudan's historical use of Cape gauge (1,067 mm) remains predominant, a shift toward standard gauge (1,435 mm), now common across much of Africa's new rail investments, could offer long-term benefits in interoperability and rolling stock availability. However, such a transition would entail significant conversion costs, including changes to track infrastructure, rolling stock fleets, maintenance systems, and training.

The potential benefits of standardisation, such as compatibility with future regional rail networks and easier procurement of equipment, must be weighed against these very real financial and logistical challenges. At this stage, while it is premature to recommend a wholesale conversion, the issue should be explored through technical feasibility studies and pilot applications on new or greenfield corridors.

One of the most transformative interventions for freight logistics would be the development of an inland dry port in the Khartoum area. As the country's principal consumption and logistics hub, Khartoum currently suffers from road congestion, inefficient freight handling, and over-reliance on truck transport. A purpose-built dry port, equipped with container handling infrastructure, bonded warehousing, customs clearance, and intermodal transfer facilities, would allow for the efficient transfer of goods from road to rail.

This would improve turnaround times, reduce costs associated with port congestion in Port Sudan, and enhance the competitiveness of Sudanese goods in both domestic and international markets. The inland port should be connected directly to the revitalised Khartoum–Port Sudan corridor and designed to serve as a logistics anchor for central Sudan.

Financing rail reconstruction will require innovation beyond traditional public capital expenditure. The National Railroad Corporation owns significant tracts of land in strategic urban locations, particularly in Khartoum, Atbara, and Wadi Medani. Much of this land, formerly dedicated to operational yards, storage, or redundant facilities, could be partially monetised through long-term leases, redevelopment partnerships, or land swaps. In Khartoum, for example, the national railway headquarters occupies prime central land that may no longer be necessary for daily rail operations in a modernised system.

The relocation of administrative functions to less valuable areas could allow for redevelopment of this land, potentially in partnership with private sector developers, with proceeds earmarked for reinvestment in railway infrastructure. In Atbara, historically the heart of Sudan's railway system, rationalisation of the footprint could similarly free up large parcels of land for civic, commercial, or residential development, while preserving core operational facilities.

Optimising the use of land assets must be done carefully and transparently to ensure public value is preserved. Strategic land management can become a cornerstone of the sector's financing model, provided it is coupled with institutional reforms that strengthen governance, clarify land ownership, and ensure accountability in redevelopment processes.

Modernising Sudan's railway system is not only a matter of rebuilding damaged infrastructure, but of rethinking the role of rail in a new national economy. With the right planning, targeted investment, and institutional reform, the rail sector can re-emerge as a key driver of inclusive growth, national integration, and regional trade connectivity.

8.3

PUBLIC TRANSPORT SYSTEM OVERHAUL

Public transport reform in Sudan is essential for post-conflict recovery and economic inclusion. Prior to the war, over 85 percent of residents in Khartoum and Port Sudan relied on public transit or walking as their primary means of mobility. This heavy reliance underscores the central role that public transport plays in everyday life, particularly among low-income populations.

However, high fares charged by often exceeding 10 percent of daily wages imposed a major financial burden, restricting access to employment, education, and essential services. With the war having disrupted or destroyed much of the limited existing infrastructure, the need to re-establish safe, affordable, and reliable public transport has become urgent.

PRACTICAL SOLUTIONS

Moving forward, Bus Rapid Transit (BRT) offers a viable and scalable solution for Sudan's urban centres. In Khartoum and other large Sudanese cities like Port Sudan and Wadi Medani, BRT corridors should be developed along high-demand routes, using locally available materials like concrete and steel. These corridors can begin with basic features such as dedicated lanes and progressively evolve to include advanced elements such as signal priority and level boarding. The phased nature of BRT deployment ensures quick delivery and adaptation to funding realities, while minimising reliance on costly imports.



8.3.1

A VISION FOR PUBLIC TRANSIT IN POST-CONFLICT KHARTOUM & SUDANESE CITIES

As Sudan enters a new phase of recovery and reconstruction, a fundamental shift is required in how cities, especially Khartoum, approach urban mobility. Public transit must be central to this transformation. Building a modern, reliable, frequent, and affordable public transport system that serves all parts of the city is not just a question of convenience. It is a prerequisite for economic recovery, urban resilience, and equitable development.

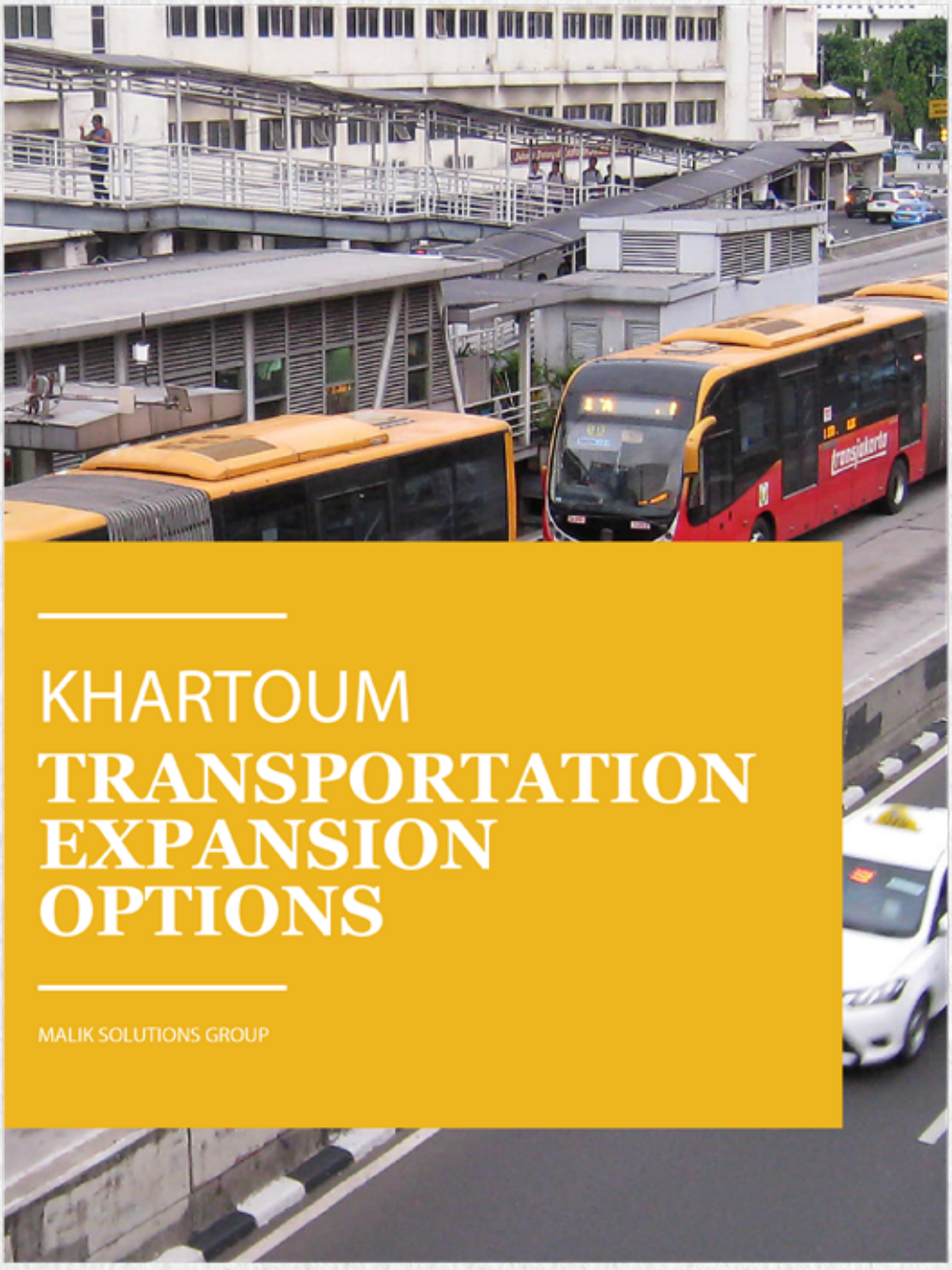
KHARTOUM'S "WALLI BUSES", THE NEED TO HAVE INTERNAL CAPACITY

Sometime between 2010 and 2012, the Khartoum State Ministry of Transport and Urban Development, under the direction of the then-Wāli (Governor) of Khartoum, introduced a fleet of modern buses branded as "Walli Buses." The initiative was part of a broader urban mobility plan that aimed to reduce traffic congestion, improve air quality, and offer an affordable alternative to the fragmented and poorly regulated minibus sector.

The buses were large, high-capacity, European-style vehicles, many of which were imported from China and other countries, and designed to operate on dedicated routes across the Greater Khartoum metropolitan area. Routes connected key urban centres, Khartoum, Omdurman, and Bahri, with stops at major terminals and transit junctions. Buses were distinguishable by their blue and white livery and operated out of formal bus stations with set stops and fares.

BUS-RAPID-TRANSIT (BRT), EXPLANATION & RECENT PROPOSALS

The "Khartoum Transportation Expansion Options" report (image to be attached), outlines a comprehensive strategy to address the critical transportation challenges facing the rapidly growing Khartoum metropolitan area. With a current population exceeding 8 million and projected to reach 10 million by 2025, the city's transportation infrastructure is under immense strain. The report proposes the introduction of a Bus Rapid Transit (BRT) system as the most feasible and impactful solution to improve mobility, reduce economic losses from congestion, and support sustainable urban growth.



KHARTOUM
TRANSPORTATION EXPANSION OPTIONS

MALIK SOLUTIONS GROUP

BRT REPORT SUMMARY CONTINUED -COMPARISON OF BRT AND OTHER TRANSIT MODES.

Khartoum's existing public transport network is dominated by privately operated minibuses ("haflas"), which carry the majority of daily trips (53% of mode share as of 2011). Despite being widely used, these services are unregulated, inefficient, and offer poor service quality, characterised by unreliable frequencies, lack of comfort (non-air-conditioned vehicles), and minimal infrastructure (e.g., shelters, stations).

Private car ownership has surged, increasing road congestion, fuel consumption, and reliance on foreign currency for vehicle imports and gasoline. Informal modes like tuk-tuks, "dafars," and "boxies" further supplement transport needs in underserved areas. Despite Khartoum's status as Sudan's economic and political hub, no formal rapid transit system currently exists, and past plans for Metro or Light Rail Transit (LRT) have not materialised due to high capital and operational costs.

COMPARISON OF TRANSIT MODES

The report evaluates three primary transit options:

Metro:
A full Metro network would offer the highest capacity (25,000+ passengers per hour per direction), but construction costs are prohibitive, estimated at over US$5 billion for 15 km of service. It would also require significant foreign expertise and import of specialized equipment, making it unsuitable for Sudan's current economic context.

Light Rail Transit (LRT):
LRT systems, while more affordable than Metro, still carry high costs (over US$1.2 billion for 45 km). They provide a smooth and comfortable ride but require imported vehicles and power infrastructure upgrades.

Bus Rapid Transit (BRT):
The report identifies BRT as the optimal choice for Khartoum. It offers a rapid implementation timeline, can be constructed using local resources, and is significantly cheaper (approximately US$1 million per kilometre, including buses and facilities). BRT can carry up to 10,000 passengers per hour per direction, and a 100 km first-phase network could serve 30% of Khartoum's current transit trips.

BRT Design and Benefits
Key elements of a high-quality BRT system include:

- **Dedicated centre-lane right-of-way** with physical separation to ensure speed and reliability.
- **Station spacing** of approximately 500 metres to balance access and operational efficiency.
- **Off-board fare collection** to minimise dwell time, aided by Customer Service Assistants at stations.
- **Use of articulated or double-articulated buses** to meet high peak demand.
- **Traffic signal priority** at intersections to reduce delays.

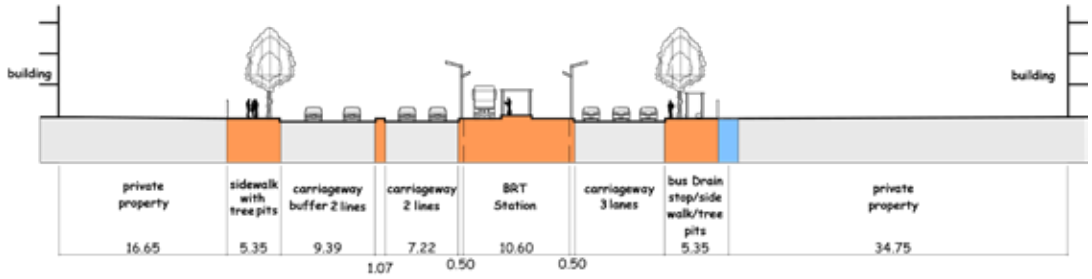
Stations would include shelters, benches, lighting, and possibly solar power. These features would improve rider comfort and accessibility, particularly important in Khartoum's extreme climate.

A BRT system also aligns with broader social and environmental goals. Public transit reduces emissions, buses emit significantly less pollution per passenger-kilometre than private vehicles, and promotes physical activity. Economically, every dollar invested in public transit yields up to **$4 in returns**, boosts property values, and improves access to jobs and services.

INTERSECTION REDESIGN FOR BRT IN KHARTOUM.

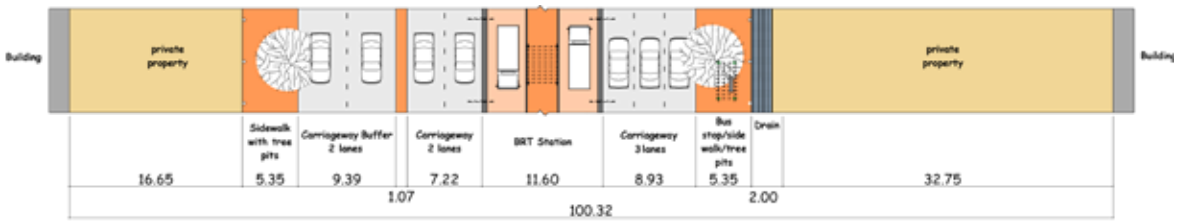
FROM KHARTOUM BRT REPORT BY THE SAME AUTHORS OF THIS REPORT

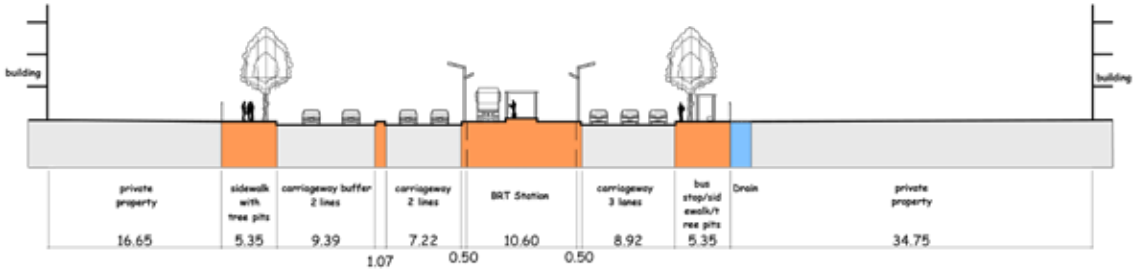




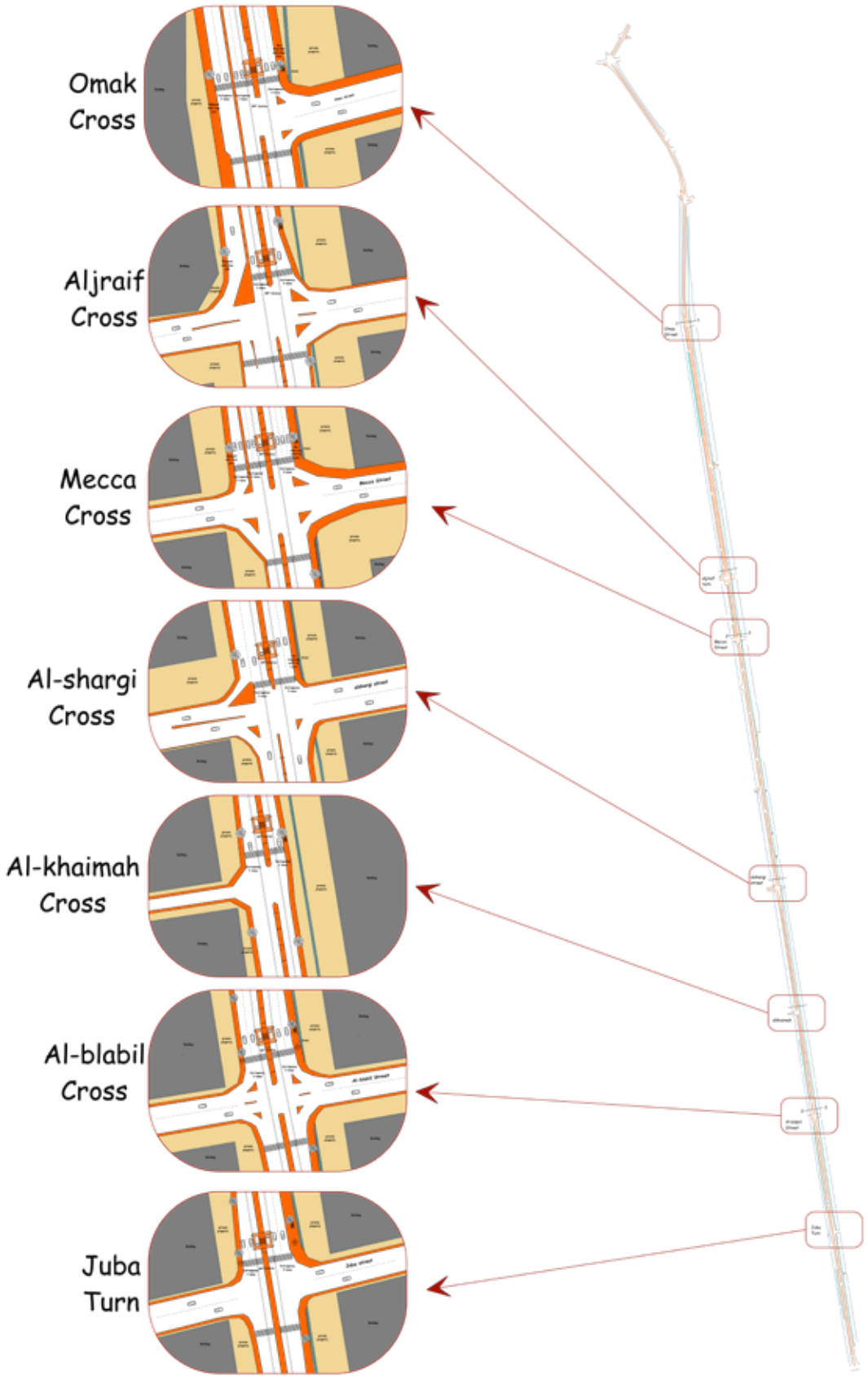
Plan

(Omak cross conceive)





INTERSECTION DESIGN FOR KHARTOUM BRT FROM REPORT BY SAME AUTHORS:



The widespread availability of public transit ensures that people can return to work, access schools, reach markets, and rebuild their lives. In a context where household incomes have been strained and communities fragmented by conflict, transit is not a secondary service; it is a lifeline.

A functioning and inclusive public transit system allows displaced persons to resettle, facilitates local economic activity, and creates the foundation for social and economic reintegration. This is particularly important in areas like Mayo, Haj Yousif, and al-Kalakla, neighbourhoods in Khartoum and Omdurman that have historically been underserved and heavily affected by both economic crisis and war-related displacement.

Moreover, investing in public transit is a far more sustainable and strategic use of national resources than relying on private vehicle ownership. Like many low- and middle-income countries, Sudan faces significant constraints on its foreign currency reserves. The widespread importation of private cars, fuel, and spare parts places an enormous burden on these reserves. By contrast, investment in public transit largely circulates within the national economy.

Wages for drivers, conductors, maintenance workers, ticket agents, and administrators all remain within Sudan. So do many of the inputs, such as concrete, steel, basic tools, and even some vehicles if locally assembled. For instance, local manufacturing capacity in the Giad Industrial City could be scaled up to support bus assembly or component supply. This multiplier effect ensures that money spent on public transit is reinvested in local communities rather than flowing abroad.

Furthermore, high-quality public transit means that people spend less of their limited incomes on transport. This increases household purchasing power and frees up money to be spent locally on food, housing, education, and small business investment. In macroeconomic terms, transit investment generates more employment and stimulates more domestic demand than private vehicle use ever could. In cities like Port Sudan and Kassala, where economic margins are thin and fuel supply is often constrained, the ability to move people using efficient mass transit systems would improve economic resilience and market efficiency.

A strong public transit system also reduces the pressure to build expensive new highways and urban expressways, which are capital-intensive, often reliant on foreign contractors and materials, and can result in the destruction of existing neighbourhoods. Highway construction through urban areas typically fragments communities, increases travel distances, and leads to cities built around the car, an urban form that is more costly to maintain, less equitable, and more environmentally damaging.

In the past, the Sudanese government considered expressways connecting Omdurman to Bahri or bypassing congested areas of Khartoum, but these would require massive land acquisition, demolition of housing stock, and foreign borrowing, costs that are unjustifiable given the country's economic situation. Sudan now has a rare opportunity to avoid the mistakes made in many cities across the Gulf and the Global South, where auto-dependence has led to congestion, pollution, and urban sprawl.

Instead of replicating these patterns, Khartoum and other Sudanese cities should aim to become cities of transit, walking, and micromobility. This means designing neighbourhoods and networks that prioritise short trips, local services, and walkable access to transit. Pedestrian infrastructure, safe sidewalks, lighting, crosswalks and shaded corridors, must be treated as integral to the public transport system, not as an afterthought. Every transit user is a pedestrian at the beginning and end of their journey. Ensuring their safety and comfort supports ridership and enhances equity, particularly for women, children, and older adults.

The importance of walkable access to transit is especially acute in places like Nyala and Wad Madani, where lower urban densities and fragmented street networks make walking more challenging. In many of these cities, especially in informal or peri-urban settlements, the lack of sidewalks, street lighting, and pedestrian safety measures has disproportionately affected low-income residents, women, and the elderly. Integrating safe walking conditions into transit planning is not only a matter of efficiency but of equity.

In the pre-war period, the majority of trips in Khartoum were already made by public transit and walking. This existing travel behaviour is an asset, not a problem to be replaced by private cars. By investing in a reformed and inclusive public transit system that includes structured minibuses, modern buses, and future BRT or rail corridors, Sudan can build cities that are healthier, more affordable, and socially cohesive.

Before the war, several pilot initiatives were explored. One notable effort was the Sudanese Urban Transport Project, supported by development partners in the late 2010s, which identified the potential for phased Bus Rapid Transit corridors on key routes, such as Sahafa to Khartoum Central and al-Ingaz Road to the airport. Though these plans were never fully implemented, they offer a strong technical foundation for a future public transit strategy.

Public transit, done well, will yield better air quality, lower household expenses, stronger community ties, and urban forms that support long-term affordability. It will also reduce infrastructure costs by avoiding the need for massive highway systems and the energy consumption that goes with them. In areas like Al Gezira and Blue Nile State where agriculture is the backbone of local economies, rural feeder transit services can also help connect farmers to markets, improve access to health care, and stem rural depopulation.

In rebuilding Khartoum and other cities, there is a generational opportunity to build for people, not for traffic. Public transit must be the spine of this new urban vision. If Sudan seizes this opportunity, it can establish a model for low-carbon, inclusive, and economically sound transport development across the African continent.



8.3.2

PRAGMATIC FARE POLICY AS A TOOL FOR SUSTAINABILITY & PROSPERITY

Fare policy must be carefully managed to ensure affordability. Strategies could include targeted subsidies, fare caps, or integration with national social support programs. By shifting from high-cost informal modes to efficient formal systems, households could significantly reduce their transport-related expenses, freeing up income for food, healthcare, and education. Moreover, reducing reliance on imported vehicles, fuel, and parts through expanded transit investment would conserve scarce foreign exchange and help build local vehicle assembly and maintenance industries.

Urban rail systems such as metro or light rail should not be pursued under current fiscal constraints. These systems are capital-intensive, slow to build, and unlikely to reach the scale or equity targets required. Sudan's post-conflict recovery demands practical, flexible, and high-impact solutions that prioritise value for money and broad access. Urban rail fails to meet these criteria and would divert critical resources from more pressing priorities.

Outside Khartoum, structured bus systems or scaled BRT corridors should be established in cities like Port Sudan, Atbara, Wadi Medani, and Dongola. These systems must respond to population movements, including the needs of displaced persons, and ensure access to employment and services in emerging economic zones. In all cases, informal transport, minibuses, shared taxis, and tuk-tuks, must be brought into the formal system through licensing, training, and integration into coordinated routes. This approach will preserve livelihoods while improving service quality, safety, and reliability.

A rebuilt public transport network in Sudan is not just a matter of mobility. It is a core element of inclusive urban recovery, economic stability, and social cohesion. Investment in this sector should be framed not only as a transport objective, but as a poverty-reduction and nation-building imperative.


موقف كوبر

8.4

INSTITUTIONAL REFORM FOR PUBLIC TRANSIT IN POST-CONFLICT SUDAN: *ESTABLISHING THE KHARTOUM PUBLIC TRANSIT COMMISSION & A NATIONAL TRANSIT AUTHORITY*

In the aftermath of Sudan's recent conflict, rebuilding public infrastructure is not only a matter of restoring basic services, it is about laying the foundation for long-term economic recovery, equitable urban development, and inclusive governance. Public transit is one of the most visible and impactful services in any city. In Khartoum and other major Sudanese cities, it is also essential for ensuring mobility, reducing household expenses, enabling social reintegration, and improving the structure and functioning of urban life. Without public transit, the poorest and most vulnerable are cut off from education, employment, and healthcare. Economic activity falters, and cities become increasingly congested, inefficient, and difficult to navigate.

To deliver on these goals, Sudan requires two foundational institutions: a Khartoum Public Transit Commission (KPTC) to govern metropolitan transit in the capital region, and a National Transit Authority (NTA) to support and coordinate local services across the rest of the country. These institutions must be adapted to the Sudanese context and designed to function in a fragile, capacity-constrained environment while being ambitious enough to lead a generational transformation in how people move.

Establishing the Khartoum Public Transit Commission and a centralised National Transit Authority offers Sudan a pragmatic and locally tailored path towards a resilient, equitable, and scalable transport system. These institutions recognise both the historical realities of Sudan's informal transport sector and the structural limitations of the state. They balance the need for public sector leadership and planning with the flexibility to work alongside private operators, communities, and development partners.

By anchoring public transit in institutions that are inclusive, capable, and responsive, Sudan can avoid the pitfalls of fragmented, short-term interventions and instead build the foundation for a transport system that supports urban recovery, economic growth, and social cohesion. These reforms will not only move people, they will move the country forward.

8.4.1

KHARTOUM PUBLIC TRANSIT COMMISSION (KPTC) - MANDATE & STRUCTURE

The Khartoum Public Transit Commission should be established as a publicly owned and accountable entity responsible for overseeing the planning, regulation, and operation of public transit in Greater Khartoum, including Khartoum proper, Bahri, and Omdurman. This body should be established by state legislation or transitional decree with a clear mandate to improve service quality, affordability, and coverage. Given the need for legitimacy and trust in a post-conflict environment, the Commission should include formal representation from local communities, including through neighbourhood associations, local councils, professional unions, and civil society organisations.

This participatory structure would promote accountability, enhance responsiveness to public needs, and help avoid the elite capture of transit planning that has occurred in past infrastructure projects, particularly those linked to politically connected vehicle importers or monopolistic transport syndicates.

The governance model could draw inspiration from African and Middle Eastern cases, such as Cape Town's MyCiTi Transit Board, which has incorporated community voices into service planning, or Amman's Transportation Regulatory Commission, which has helped formalise Jordan's informal minibuses through route contracting and fleet renewal.



8.4.2

THE KPTC SHOULD HAVE THE FOLLOWING CORE RESPONSIBILITIES

- **Network Design and Planning:** The KPTC would lead the planning and continuous adjustment of the public transit network in Greater Khartoum. This includes the coordination of trunk routes, feeder services, transfer hubs, and integration of multiple vehicle types (e.g., buses, minibuses, tuk-tuks). Without this coordination, cities often experience route duplication, underserved zones, and competition that undermines reliability and user trust. Given the lack of a central coordinating body before the conflict, this function is essential to unlocking Khartoum's potential as a functioning metropolitan region.

- **Fare Policy and Affordability Strategies:** The Commission should develop a fair and inclusive affordability framework, ensuring that transit remains financially accessible to low-income residents, displaced persons, and the elderly. Options may include income-based fare discounts, student and elder passes, integrated ticketing, capped fares for transfers, or flat pricing for multi-segment journeys. International experience shows that predictable and transparent fare policies also improve revenue collection, reduce fare evasion, and build user loyalty.

- **Management of Trunk Routes:** The KPTC should operate and manage the city's primary high-capacity transit corridors, such as Bus Rapid Transit (BRT) routes, and major bus lines. Public sector leadership in this domain is necessary to ensure consistent service quality, provide user information (such as timetables and real-time updates), and enable network-wide integration. These high-frequency, high-ridership lines will form the backbone of Khartoum's transit network and act as the anchor for private feeder services.

- **Regulation and Permitting of Private Operators:** Rather than displacing the large informal transport workforce that has historically filled service gaps, the Commission should regulate and formalise it. Through a clear licensing framework, route allocation, and service contracting, the KPTC can bring private operators into the system while preserving jobs and livelihoods. It would supervise vehicle inspections, enforce safety compliance, and oversee driver certification and customer service standards.

- **Support for Operator Upgrading:** Recognising that most informal operators lack access to capital and typically operate on tight margins, the Commission should work with commercial banks, microfinance institutions, and development partners to create vehicle financing schemes. These may include low-interest loans, group guarantees, or lease-to-own programs for minibus, tuk-tuk, and coaster upgrades. In the long term, these schemes will improve fleet reliability, reduce fuel consumption and emissions, and improve the dignity of work for operators.

8.4.3

INTEGRATION OF INFORMAL SYSTEMS

Prior to the war, Khartoum's public transport was dominated by the Hafla system, a loosely regulated network of minibus operators organised into unions and route-based associations. These operators often negotiated route assignments among themselves although at times their licenses assigned them to routes, with limited oversight from government authorities. The system's reach was broad, but it lacked reliability, safety, and integration.

Given the entrenched presence and organisational strength of veteran drivers and unionised transport workers, any attempt to reform the system must work with, rather than against, these actors. This includes involving them in route design, fare policy discussions, and enforcement frameworks. Successful examples of such integration exist in Nairobi, Lagos, and Kigali.

The KPTC should aim to transition informal services into a formalised framework through contracts, service agreements, and incentives. This includes providing clear roles in the broader network (e.g., acting as feeder services), and linking operator licensing to participation in scheduled service coordination.

At the same time, the Commission must be cautious not to over-regulate or impose unrealistic operational standards in the early stages. Sudanese transit users and operators have experienced decades of weak enforcement and informal negotiation. A sudden shift to rigid command-and-control regulation would be unenforceable and likely counterproductive. Instead, the Commission should phase in regulation gradually and build trust through transparent rules, performance-based contracts, and technical support.

ENSURING MINIMUM SERVICE STANDARDS

One of the enduring failures of private sector-dominated transport systems is the lack of service in low-density or low-income areas and during off-peak hours. These are precisely the times and places where public mobility is most critical, from workers returning late at night, to schoolchildren in peripheral districts, to women who face heightened security risks when mobility is limited. The KPTC must take responsibility for guaranteeing geographic and temporal service coverage, even where routes are not profitable. This can be done through subsidised service contracts, public route operations, or cross-subsidisation using trunk route revenues.

8.5

ESTABLISH A NATIONAL TRANSIT AUTHORITY (NTA)

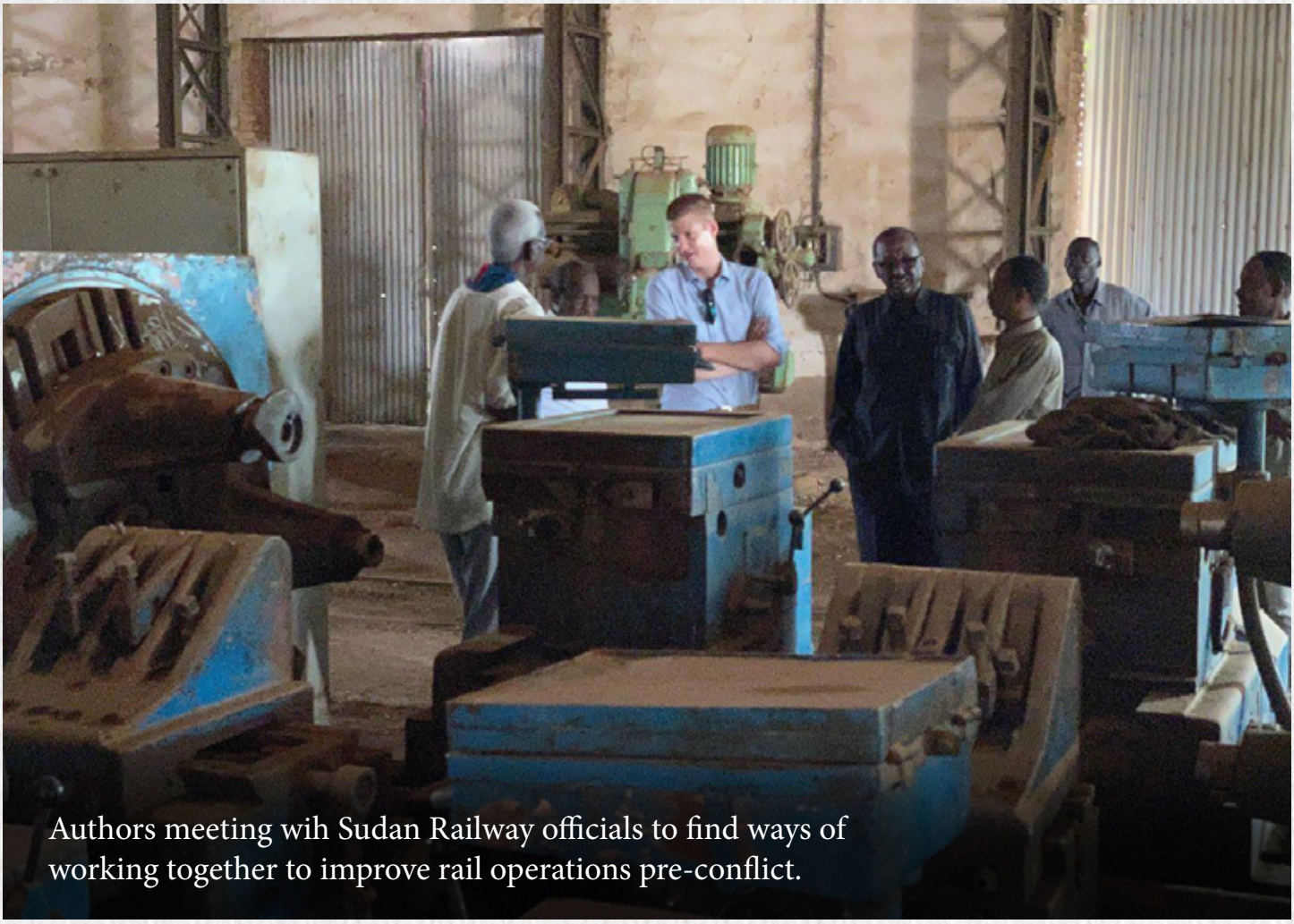


8.5.1

MANDATE & STRUCTURE

While Khartoum will require its own dedicated governance structure, the rest of Sudan, where administrative, financial, and human resource capacities are often weaker, requires a centralised body to plan and deliver transit services. The proposed National Transit Authority (NTA) should be modelled on entities such as BC Transit in Canada or Tanzania's Land Transport Regulatory Authority (LATRA), which provide technical and operational support to multiple municipalities under a unified governance framework.

This model is highly relevant to Sudan, where many secondary cities, such as Kassala, Atbara, Nyala, Wad Madani, and El Fasher, currently lack any form of structured public transport governance. Local authorities in these cities do not have the technical capacity, human resources, or financial base to create and manage stand-alone transit agencies. A central body can provide unified planning tools, standardised service contracts, training, and vehicle procurement support that ensures economies of scale and professional standards across the country.



Authors meeting wih Sudan Railway officials to find ways of working together to improve rail operations pre-conflict.

8.5.2

CORE RESPONSIBILITIES:

- **Centralised Planning and Support:** The NTA would conduct urban and rural mobility needs assessments, develop regional transit master plans, and work with local municipalities to implement service delivery using both public and contracted private providers. It would also facilitate data collection and performance monitoring to improve service quality and accountability.

- **Capacity Building and Professionalisation:** A critical function of the NTA would be to train a new generation of Sudanese transit planners, operators, and inspectors. This would include establishing technical schools or training institutes, possibly in collaboration with universities or technical colleges, creating career pathways in transport operations, and setting national occupational standards for transit jobs.

- **Standardisation and Quality Assurance:** By creating templates for fare structures, operating procedures, service design, vehicle types, and safety protocols, the NTA would ensure that transit systems across Sudan maintain a minimum standard of quality. This also simplifies operator compliance while providing consistency for passengers across different cities.

- **Funding and Resource Allocation:** The NTA would act as a national clearinghouse for transit funding. It could manage grants and soft loans from multilateral development banks, coordinate the procurement of vehicles in bulk (reducing costs and improving access to spare parts), and allocate operational subsidies based on need and performance. This national pooling mechanism also insulates smaller cities from fiscal shocks and revenue volatility.

8.5.3

FUTURE DECENTRALISATION

As local capacities grow, especially in economically dynamic cities or states which develop stronger governance, the NTA can support the transition towards locally managed transit authorities, enabling cities to take over full responsibility for their services. The NTA's early role should be to build this readiness through policy development, hands-on mentorship, and resource sharing. Until that time, centralised service delivery under the NTA offers the best path to ensuring consistent and efficient public transit across the country.

8.6

PORT & MARITIME INFRASTRUCTURE

Revitalising Sudan's ports and maritime infrastructure is a multifaceted endeavour that requires coordinated efforts across various sectors. Through comprehensive assessments, institutional reforms, infrastructure investments, and capacity building, Sudan can transform its ports into efficient, competitive, and sustainable gateways that drive economic growth and regional integration.



8.6.2

COMPREHENSIVE ASSESSMENT OF PORT SUDAN & SATELLITE TERMINALS

Sudan's principal maritime gateway, Port Sudan, along with its satellite terminals, requires an immediate and thorough operational, engineering, and commercial assessment. This evaluation should focus on berth conditions, capacity constraints, and dredging requirements to ensure navigational safety and accommodate larger vessels. Additionally, the assessment must examine the status of port handling equipment, identify customs clearance and storage bottlenecks, and evaluate port security measures to ensure compliance with international maritime standards.

8.6.3

INSTITUTIONAL REFORM: RE-ESTABLISHING THE NATIONAL PORTS AUTHORITY: *A STRATEGIC VISION FOR SUDAN'S MARITIME GATEWAY*

Re-establishing a National Ports Authority with a clear legal mandate, autonomous governance, and strong operational focus is essential for revitalising Sudan's maritime infrastructure. The NPA would not only help restore efficiency at existing ports, but also unlock future trade corridors, attract global logistics operators, and anchor Sudan's integration into regional and global supply chains.

By leveraging partnerships, enhancing transparency, and investing in human capital, the NPA can become a cornerstone of Sudan's post-conflict recovery. It offers not only a logistics solution, but also a platform for job creation, economic diversification, and renewed international confidence in Sudan's development trajectory.

In light of Sudan's current challenges and historical context, re-establishing a National Ports Authority (NPA) is pivotal for enhancing the efficiency and governance of the country's maritime ports. This initiative aims to centralise oversight, streamline decision-making, attract private sector investment, foster international partnerships, modernise critical infrastructure, and ensure accountability and optimal use of public funds, particularly as Sudan navigates economic recovery and reengagement with global trade.

8.6.4

PROPOSED STRUCTURE OF THE NATIONAL PORTS AUTHORITY

How the NPA is structured and implemented will be key to its suggest and therefore careful consideration must be taken to ensure that the NPA is appropriately set-up and structured.

LEGAL AND INSTITUTIONAL AUTONOMY

The NPA should be constituted by law as an autonomous, commercially oriented, and performance-based agency, separate from the Ministry of Transport but operating under a strategic policy framework defined by the government. This separation ensures operational independence, financial flexibility, and quicker responsiveness to technical and commercial needs.

Such autonomy would allow the NPA to streamline decision-making by reducing dependency on ministry-level approvals for operational and procurement decisions, the NPA can expedite port expansions, maintenance contracts, and public-private partnerships.

The appropriate level of autonomy would also allow the NPS to attract private sector Investment. A clear, predictable regulatory framework is essential for mobilising private capital and attracting reputable international terminal operators, logistics providers, and shipping lines.

And finally autonomy enables the NPA to enter into long-term strategic cooperation agreements with port authorities in the region (e.g., Djibouti, Egypt, and Saudi Arabia) and with global organisations such as the International Association of Ports and Harbours (IAPH) or the World Bank's Global Transport Facility.

GOVERNANCE AND OVERSIGHT

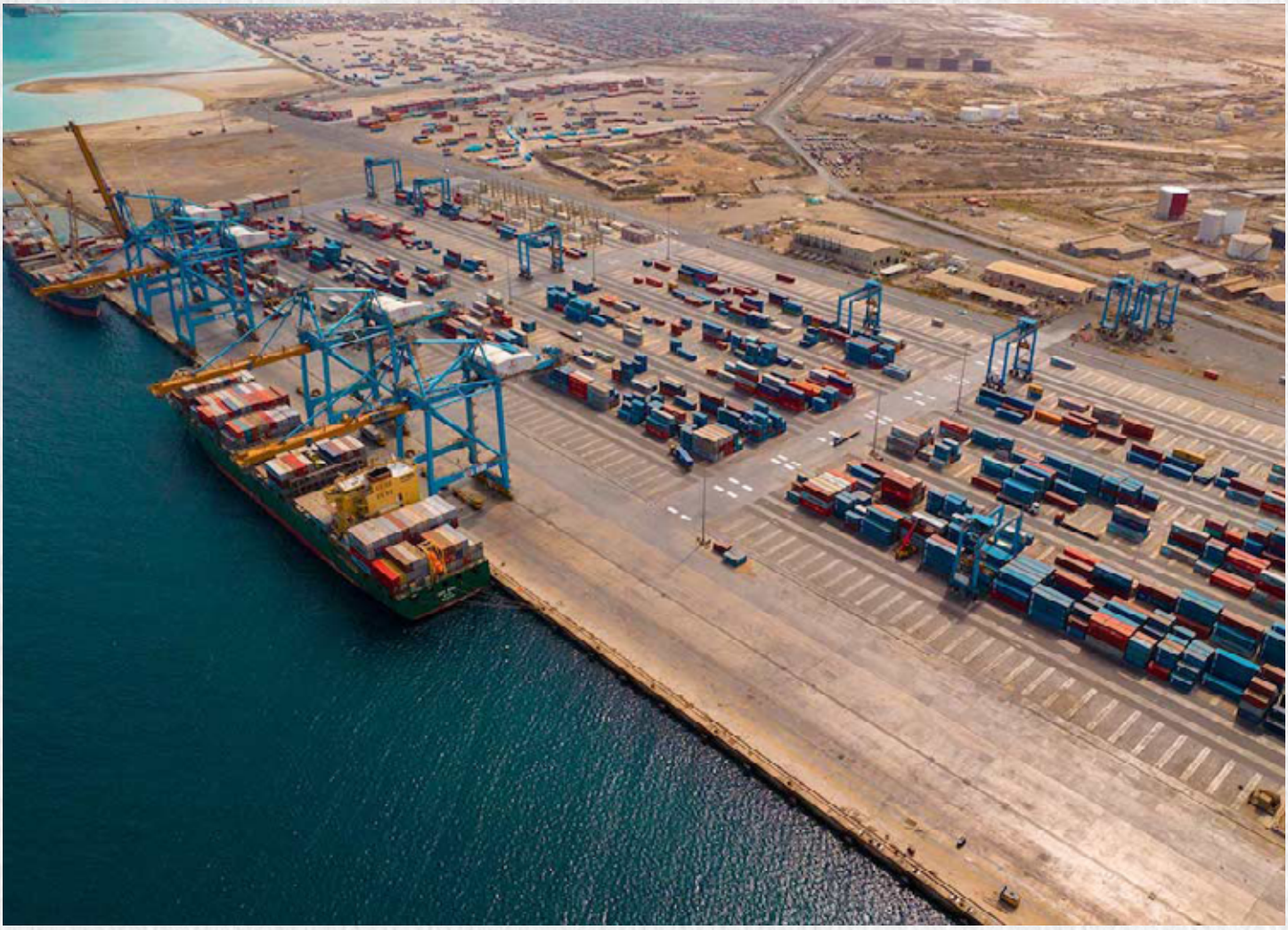
The NPA should be overseen by a professional, multi-stakeholder board of directors, with representation from the Ministries of Transport, Finance, and Trade; port users (e.g., logistics and shipping firms); labour unions; and civil society observers. The board would be responsible for setting strategic direction, providing financial oversight, and monitoring performance, while day-to-day management would be handled by a professional CEO and executive team.

Such a structure promotes transparency and accountability in capital investment decisions; Public confidence in how state assets are used; Labour representation, particularly important given the historical influence of dockworker unions in Port Sudan.

OPERATIONAL DEPARTMENTS

The NPA should be structured around clearly defined technical directorates to ensure proper functioning and the below outlines a high-level potential structure that would address many of the issues the NPA would need to address and give it the underlying structure to do so.

- **Infrastructure Development and Engineering:** Responsible for dredging, berth expansion, cargo handling equipment, and the development of digital port infrastructure (such as port community systems);
- **Regulatory and Maritime Compliance:** Tasked with enforcing safety standards, environmental compliance, and adherence to International Maritime Organisation (IMO) regulations;
- **Investment and Concessions:** Dedicated to developing and managing PPP contracts, private terminal operators, and joint ventures;
- **Human Resources and Capacity Building:** Responsible for training, workforce planning, and coordination with vocational institutions;
- **Port Security and Risk Management:** Focused on customs coordination, anti-smuggling initiatives and emergency preparedness.



8.6.5

ADDRESSING FINANCIAL & INSTITUTIONAL CONSTRAINTS

Sudan has for many decades faced both limited fiscal space and institutional capacity deficits, particularly at the federal level. These challenges have only be exacerbated by the recent armed conflicts. Therefore, the NPA should consider adopting a phased, partnership-oriented, and cost-efficient strategy that includes several different components.

First, Sudan can replicate successful African models such as the Port of Mombasa (Kenya) and Tema Port (Ghana), where private terminal operators have invested in modern handling equipment and operations in return for long-term lease concessions, effectively using Public-Private Partnerships (PPP) model. The NPA could act as the public regulator and landowner, while contracting operators for container terminals, bulk handling, and cruise facilities.

Along with the P3 model, The NPA should engage with multilateral donors, including the African Development Bank (AfDB), the World Bank, and development partners like the European Union (EU) and Japan, for grants and loans that support infrastructure upgrades, digitalisation, and intermodal integration.

And finally through partnering with institutions such as the IMO's Regional Maritime Universities or the Arab Academy for Science, Technology and Maritime Transport (Egypt) capacity building and technical training could be achieved and would allow Sudanese staff to access high-quality training. The NPA should also establish its own Port Training Institute in Port Sudan to build a long-term skills pipeline.

LEARNING FROM PAST INITIATIVES

In 2022, Sudan signed a high-profile $6 billion agreement with the UAE's AD Ports Group and Invictus Investment to construct a new Red Sea port and logistics zone. The project included a 200-kilometre road corridor to the Ethiopian border and promised a deepwater container terminal. However, the deal was suspended and ultimately cancelled in 2024, following Sudanese accusations that the UAE had provided material support to the Rapid Support Forces (RSF) during the civil war.

This episode highlights the dangers of opaque, politically driven concession agreements and the strategic risks associated with foreign dependence in the absence of strong regulatory safeguards. It also underscores the urgent need for a professional port authority capable of evaluating, structuring, and negotiating international partnerships in a transparent and accountable manner.

8.7

DEVELOPMENT OF INLAND PORTS: *KHARTOUM DRY PORT INITIATIVE*

To alleviate congestion at coastal ports and improve logistics efficiency, the development of inland ports, particularly a dry port in Khartoum, is essential. This facility would serve as a logistics hub, facilitating customs clearance, container storage, and intermodal transfers between trucks and rail and trucks-to-trucks. By enabling freight consolidation and deconsolidation, the Khartoum dry port would reduce transportation costs, expedite cargo movement, and enhance trade competitiveness.

There have been various proposals to develop inland dry ports to alleviate congestion at coastal facilities. For instance, the Garri Free Zone, located 70 km north of Khartoum, was proposed as a site for a dry port with direct rail connections to Port Sudan. This initiative aimed to facilitate customs clearance and cargo handling inland, thereby reducing pressure on coastal terminals, but for a number of reasons never was fully developed. This was not the envisioned "dry port" discussed here, but essentially rather a supplementary port concept.

RE-ESTABLISHING THE KHARTOUM DRY PORT: A STRATEGIC INLAND LOGISTICS HUB FOR SUDAN

The development of the Khartoum Dry Port represents a strategic move to modernise Sudan's logistics infrastructure, reduce pressure on coastal ports, and enhance the country's trade competitiveness. By adopting a well-planned implementation strategy that includes careful site selection, effective governance, diversified funding, and efficient operations, the dry port can serve as a catalyst for economic development and regional integration.

The creation of an inland logistics port, such as the proposed Khartoum Dry Port is a strategic initiative to alleviate congestion at coastal ports and improve logistics efficiency. This facility would facilitate customs clearance, container storage, and intermodal transfers between trucks and rail, enabling freight consolidation and deconsolidation. Such a development aims to reduce transportation costs, expedite cargo movements, and further strengthen Sudan's position in regional and global trade. Sudan National Railways could take the lead in the development and use land it currently has in its portfolio, noting that there is potential revenue model here.


Kalmar



THE INLAND DRY PORT CONCEPT

An inland dry port is an intermodal terminal directly connected to a seaport by road or rail. It operates as a centre for the transshipment of sea cargo to inland destinations, offering services such as customs clearance, container storage, and cargo handling. This concept is particularly beneficial for landlocked regions or areas distant from seaports, as it brings port services closer to shippers, reduces congestion at seaports, and improves the efficiency of cargo movement.

IMPLEMENTATION STRATEGY FOR THE KHARTOUM DRY PORT

The implementation of a dry port facility in Khartoum requires a comprehensive and well-sequenced strategy that ensures both operational feasibility and long-term sustainability. This strategy should begin with careful site selection, followed by the establishment of a governance and management model, the identification of funding mechanisms, and the development of key operational systems.

A) Site Selection Criteria

Selecting the appropriate location for the Khartoum Dry Port is a foundational step that will significantly impact its long-term functionality. The selected site should be situated in close proximity to major transportation corridors. Ideally, it would be located near existing or planned railway lines to facilitate rail-to-road cargo transfers, while also ensuring easy access to national highways that link to industrial and commercial zones. This would, as noted, allow SNR to monetise its land while holding onto title.

Additionally, the site must offer ample land to accommodate the initial infrastructure requirements and allow room for future expansion as trade volumes increase. It is essential that the site has reliable access to critical utilities, including electricity, water, and telecommunications, as these are indispensable for the smooth operation of customs, warehousing, and logistics services. Finally, the location must be politically stable and secure. Long-term investment and uninterrupted operations are only possible in an environment where security threats are minimised and the rule of law is upheld.

B) Governance and Management Model

The proposed governance model for the Khartoum Dry Port is a public-private partnership (PPP). This hybrid approach seeks to balance public oversight with private sector investment and operational efficiency. Under this model, the public sector, through the Ministry of Transport or a future National Ports Authority (or Sudan National Railways), would retain responsibility for strategic oversight, ensuring compliance with national transportation and trade policies, and facilitating land acquisition and inter-agency coordination.

Meanwhile, the private sector would be tasked with designing, constructing, financing, and managing the facility. This division of responsibilities leverages the operational expertise, innovation, and financial capacity of the private sector while safeguarding the public interest through regulation and oversight. Such PPPs have proven effective in many countries for logistics infrastructure, provided that contractual arrangements are well-defined, transparent, and enforceable.


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C) Funding Mechanisms

In view of Sudan's constrained public finances, a diversified financing approach will be necessary to deliver the Khartoum Dry Port. Private investment will serve as the cornerstone of the funding model, with investors incentivised through long-term operational concessions and revenue-sharing arrangements. In parallel, the government should actively seek support from international financial institutions such as the African Development Bank and the World Bank, which could provide concessional loans or infrastructure guarantees which may allow the government to substantially derisk the project.

Donor agencies should also be engaged to provide technical assistance and grant funding, particularly during the planning and capacity-building phases. To ensure the sustainability of operations, the setting of the tariff structure for the dry port should be arms-length, but with broad protections against monopoly control. These user fees, applied to cargo handling, warehousing, customs clearance, and related services, will create a revenue stream to cover operating costs and, where appropriate, service debt. It would also allow for the long-term viability of the dry port if managed correctly.

4. OPERATIONAL CONSIDERATIONS

A series of operational factors must be addressed to ensure the successful launch and long-term efficiency of the Khartoum Dry Port. First, the customs and regulatory framework must be modernised to support efficient and transparent clearance procedures. This includes implementing risk-based inspections, digitising customs documentation, and allowing for pre-arrival processing of cargo.

Second, a robust digital platform must be established to integrate cargo tracking, inventory management, gate access, and intermodal transfers. Ideally, this system should be interoperable with platforms used at Port Sudan and other trade gateways to facilitate real-time visibility across the logistics chain.
Third, significant investment will be required in workforce development. Operators, customs officials, and warehouse managers must be trained in modern logistics practices and familiarised with the technologies deployed.

Lastly, stakeholder engagement must be prioritised from the outset. This means involving not only key government agencies and private sector actors, but also local communities that may be affected by the development. Such engagement is critical for mitigating social risks, building local support, and ensuring that the project delivers inclusive benefits.

5. EXPECTED BENEFITS

The establishment of a dry port in Khartoum is expected to generate a broad set of benefits for both the national economy and the regional logistics ecosystem. By shifting a portion of customs clearance and cargo handling inland, the dry port will help relieve congestion at Port Sudan and other coastal entry points, improving turnaround times and reducing demurrage costs.

The dry port will also contribute to enhanced logistics efficiency by centralising processing activities and reducing duplication of effort along the supply chain. This, in turn, will strengthen Sudan's trade competitiveness by lowering transportation costs and improving service reliability for exporters and importers.

The facility is expected to catalyse local economic development through direct job creation, increased demand for auxiliary services, and the attraction of investment into surrounding industrial and warehousing zones. Over time, the Khartoum Dry Port could become a cornerstone of a national network of inland terminals, supporting Sudan's reintegration into regional and global trade systems.

AN IMPLEMENTATION STRATEGY FOR THE KHARTOUM DRY PORT

The successful implementation of the Khartoum Dry Port requires a comprehensive strategy that addresses site selection, governance, financing, operational readiness, and long-term economic impact. Each of these components must be carefully planned to ensure the dry port is not only functional but capable of serving as a critical node in Sudan's national and regional trade logistics system.

The first consideration in the implementation process is the selection of a suitable site. The location of the dry port must be strategically chosen to ensure optimal connectivity and operational efficiency. To facilitate the smooth transfer of goods between modes of transport, it should be situated in close proximity to major transportation networks, particularly near existing or planned railway lines and major roads.

The site must also provide sufficient land area to accommodate current infrastructure requirements and allow for future expansion as trade volumes grow. In addition to physical space, access to essential utilities such as electricity, water, and telecommunications must be assured, as these are critical to the functionality of customs, warehousing, and communication systems. Security and political stability in the surrounding area are also essential, as uninterrupted operations and investment confidence depend on a secure operating environment.

In terms of governance and management, the development and operation of the Khartoum Dry Port should be based on a public-private partnership model. In this structure, the public sector, likely represented by the Ministry of Transport or a reconstituted National Ports Authority, would take responsibility for regulatory oversight, policy alignment, and facilitation of land acquisition.

Meanwhile, the private sector would lead the design, construction, financing, and management of the facility. This arrangement capitalises on the operational expertise and financial capacity of private investors, while ensuring that national interests and public policy objectives are safeguarded through effective public sector regulation. Successful implementation of this model will depend on clear contractual frameworks, enforceable service standards, and strong institutional capacity within the public sector to monitor and guide the partnership.



Financing the Khartoum Dry Port requires a multi-source strategy. Given the fiscal constraints faced by the Sudanese government, it is unlikely that public financing alone will be sufficient. Instead, the project should be structured to attract private investment, with investors incentivised through long-term operating concessions and revenue-sharing mechanisms.

In parallel, support should be sought from international financial institutions such as the African Development Bank and the World Bank, which may offer concessional loans, partial guarantees, or technical assistance to mitigate risk and enhance bankability.

Development partners and donor agencies should also be engaged to provide both financial support and advisory services, particularly in the areas of institutional reform and capacity building. To ensure long-term financial sustainability, a system of user fees should be introduced, covering services such as cargo handling, warehousing, customs processing, and intermodal transfers. These fees would generate the revenue required for ongoing operations, maintenance, and reinvestment.

From an operational perspective, several core issues must be addressed to ensure the Khartoum Dry Port functions as an efficient and reliable logistics hub. A modern and streamlined customs and regulatory framework must be established, with simplified procedures, reduced paperwork, and an emphasis on risk-based inspections to expedite the movement of goods.

The adoption of advanced digital systems for cargo tracking, inventory control, and coordination between agencies is essential for operational transparency and efficiency. These systems should be interoperable with platforms used at coastal ports to support end-to-end visibility across the logistics chain. Equally important is the development of a trained workforce capable of managing and operating the facility according to international standards.

This includes not only technical training for port staff but also capacity building for customs officials, security personnel, and administrative staff. The success of the dry port also depends on the effective engagement of stakeholders. Government agencies, private sector actors, and local communities must be involved throughout the planning and implementation process to ensure alignment of interests, build trust, and mitigate any potential social or environmental risks.

The expected benefits of the Khartoum Dry Port are both immediate and long-term. By relocating certain cargo handling and customs functions from Port Sudan and other coastal terminals to an inland location, the dry port would relieve congestion at these overstretched facilities, improving turnaround times and reducing shipping delays. This inland redistribution of cargo processing would also increase the efficiency and reliability of supply chains serving Khartoum and the wider central region.

Over time, the dry port would become a catalyst for economic development, stimulating local employment, attracting logistics and industrial investment, and enhancing the region's role in national and transnational trade. Lower transport and handling costs, combined with faster clearance procedures, would boost the competitiveness of Sudanese exports in regional and global markets. Ultimately, the Khartoum Dry Port could evolve into a key logistics platform not only for Sudan but for surrounding countries, supporting Sudan's strategic ambition to serve as a regional trade and transport hub linking the Red Sea with inland Africa.



SRC Khartoum Maintenance facilities pre-conflict

8.8

AIRPORTS & DOMESTIC AIR CONNECTIVITY IN SUDAN

Revitalising Sudan's aviation sector is pivotal for the nation's economic recovery and regional integration. A multifaceted approach encompassing infrastructure assessment, institutional strengthening, domestic service re-establishment, national carrier enhancement, and airspace management will lay the foundation for a resilient and efficient aviation system. Collaborative efforts with international partners and adherence to global aviation standards will further ensure the success of these initiatives.

ESTABLISHMENT AND STRENGTHENING OF THE CIVIL AVIATION AND AIRPORTS AUTHORITY

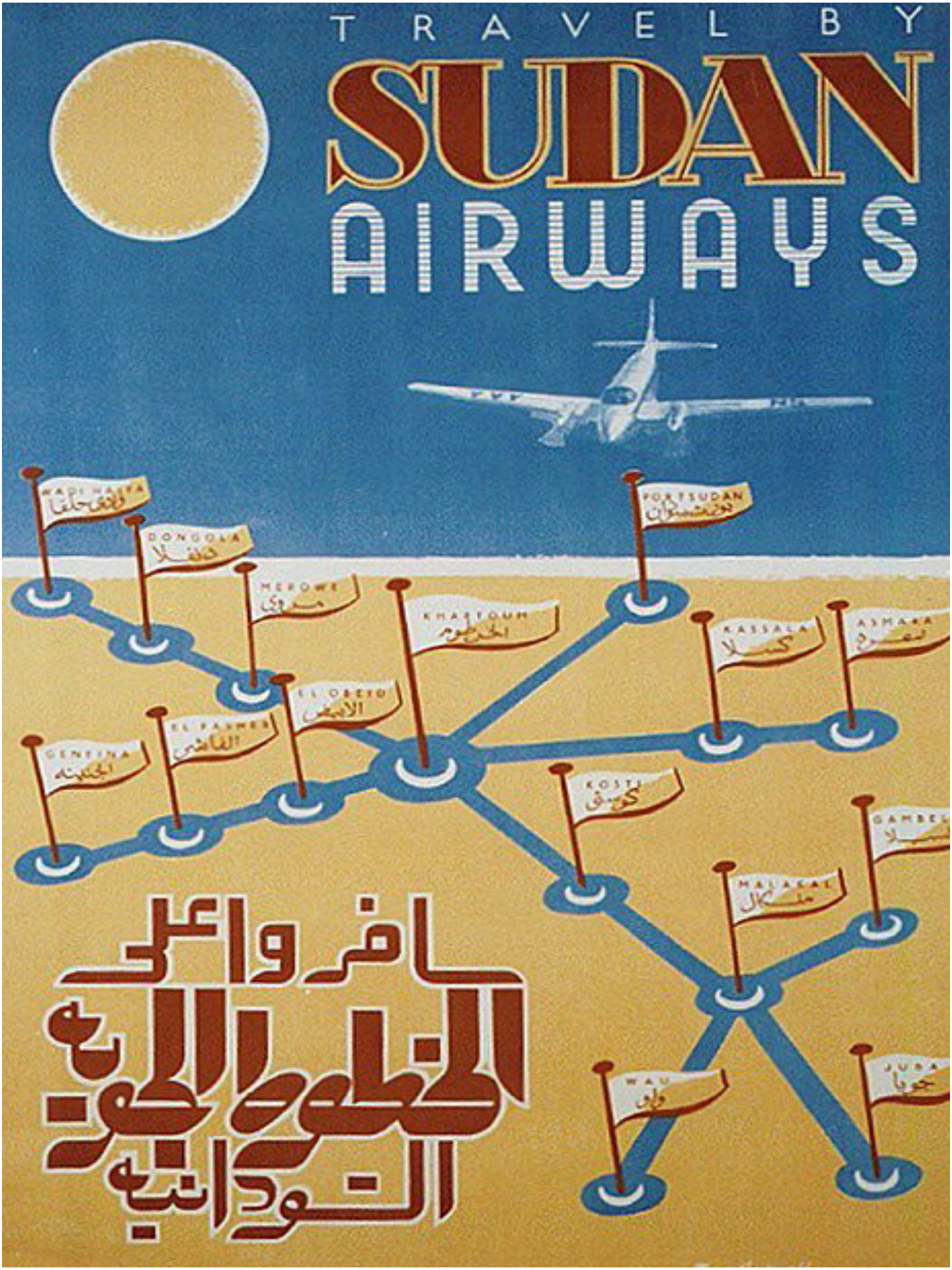
To oversee the rehabilitation and regulation of Sudan's aviation sector, the establishment of a robust Civil Aviation and Airports Authority is essential. This authority would be responsible for licensing and certification of airports and airstrips, ensuring compliance with international safety standards. It would manage air traffic control and navigation systems, oversee airport investment and planning, and coordinate with international aviation bodies to align Sudan's aviation practices with global norms. Furthermore, the authority should implement performance-based navigation (PBN) systems to optimise airspace usage and enhance safety, as outlined in Sudan's national PBN implementation plan.

RE-ESTABLISHMENT AND EXPANSION OF DOMESTIC AIR SERVICES

Reintroducing scheduled domestic passenger services is crucial for reconnecting Khartoum with regional capitals. Utilising smaller, fuel-efficient aircraft, such as turboprops with seating capacities ranging from 30 to 70 passengers, is advisable. These aircraft have lower fuel and crew costs, require minimal ground infrastructure, and are well-suited for short-haul flights in low-volume markets. In the initial stages, leasing or contracting these aircraft through regional or international carriers can facilitate the swift resumption of domestic air services, thereby enhancing mobility and supporting economic recovery across Sudan.

By the 1930s, Imperial Airways operated regular flying boat and landplane services through Sudan. Stops in Khartoum, Port Sudan, and Wadi Halfa connected Sudan to the global imperial air network, bringing faster communications, mail, and limited passenger services to a region previously isolated by desert and river barriers. These early air links enhanced British administrative control, allowing for quicker movement of officials, diplomatic messages, and commercial goods across the empire.

The introduction of air services contributed to Sudan's limited integration into global trade and information networks. It shortened travel times dramatically compared to traditional river and camel routes, fostering modest commercial activity around key airfields and supporting early urban growth, particularly in Khartoum and Port Sudan. However, the services largely served imperial needs rather than broader Sudanese development, with local populations benefiting indirectly, if at all.


TRAVEL BY
SUDAN
AIRWAYS
WADI HALFA
DONGOLA
MEROWE
KHARTOUM
EL OBEID
EL FASHER
GENEINA
PORTSUDAN
KASSALA
ASMARA
KOSTI
MALAKAL
WAU
JUBA
سافر واعلى
الخطوط الجوية
السودانية

ENHANCEMENT OF SUDAN AIRWAYS AND FLEET MODERNISATION

Sudan Airways, the national carrier, has ambitious plans to significantly boost its fleet size, aiming to operate a total of 15 aircraft by the close of 2024. Currently, the airline's operational capacity is severely restricted to just a single Airbus A320, primar ily servicing the Khartoum-Cairo route. The challenges faced are profound, as years of US sanctions have created significant hurdles in procuring new aircraft and maintaining its existing fleet. This has resulted in a grounded fleet of 12 out of 14 planes, making the need for a comprehensive revival strategy immediately apparent.

The Sudanese government's plan to dedicate three aircraft to Hajj operations provides a concrete step towards improving capacity. Moreover, the expertise brought in through a partnership with Lufthansa Consulting could play a pivotal role in guiding Sudan Airways' revival. The airline faces a steep climb, but it possesses a strong foundation and with the right support, it has a chance to become a more prominent player on the global aviation stage, reconnecting travellers to a wider range of destinations. A new airport near Khartoum is expected to support these ambitions.

DEVELOPMENT OF A NEW AIRPORT NEAR KHARTOUM

The development of a new airport near Khartoum is seen as a major catalyst for future growth. It will substantially enhance the airport's capacity to handle more passengers, significantly increasing Sudan Airways' potential to become a regional hub. This new infrastructure is expected to support the airline's expansion plans and improve overall connectivity within the region.

OPENING OF AIRSPACE IN EASTERN SUDAN

The Sudanese Civil Aviation Authority has issued a pilots' bulletin (NOTAM) through the regional office of the International Civil Aviation Organisation in Cairo, opening the eastern route to air traffic. This decision reopens the airspace of the three eastern Sudanese states, Red Sea, Kassala, and El Gedaref, to air traffic via the entry point in Halaib to Port Sudan and Tokar. This provides a short and safe air path for flights coming from Europe to East African countries and some islands in the Indian Ocean. The reopening of these air routes is expected to allow about 100 flights per day to cross between Europe and East African countries, after being forced to avoid Sudanese airspace during the conflict.

While these functional areas are outlined in greater detail elsewhere, it is critical to stress the importance of structure and staffing in making the Ministry operational. Sudan's new Ministry of Transport must recruit and retain staff with a blend of international experience and education alongside practical, on-the-ground expertise.

Global best practices in infrastructure planning and delivery are important, but without people who understand local realities, whether from Port Sudan, Nyala, Kassala, or Khartoum, policies will not reflect the country's diverse needs. A hybrid workforce that can bridge theory and practice will be essential.

Given Sudan's size, diversity, and governance traditions, a centralised national ministry must also be supported by regional offices, either organised at the state level or grouped by transport corridors or regions. These offices will ensure that planning and operations are responsive to local realities and that community-level priorities are communicated upward. They will also be critical for the implementation of devolved functions, especially where roads, public transit, and logistics infrastructure intersect with local governments and private sector operators.

8.9

MINISTRY & POLITICAL CONTROL

REBUILDING PUBLIC SECTOR CAPACITY: *THE CASE FOR A STRONG AND PROFESSIONAL MINISTRY OF TRANSPORT IN SUDAN*

As Sudan undertakes the immense task of national reconstruction, establishing a strong, professional, and capable Ministry of Transport is essential to support recovery, enable long-term economic growth, and restore the connective infrastructure that binds the country together. Effective transport governance is not simply about building roads or managing airports, it is about ensuring that infrastructure investment is guided by clear national priorities, implemented efficiently, and managed transparently for the benefit of all Sudanese citizens.

The re-establishment of the Ministry must be grounded in a modern institutional framework that separates political leadership and accountability from the day-to-day professionalism of the civil service. While elected or appointed leadership should set strategic direction and represent public values, a technically competent civil service must drive delivery. This distinction is vital to prevent politicisation of technical functions and to ensure that decisions are evidence-based, consistent, and shielded from short-term pressures.

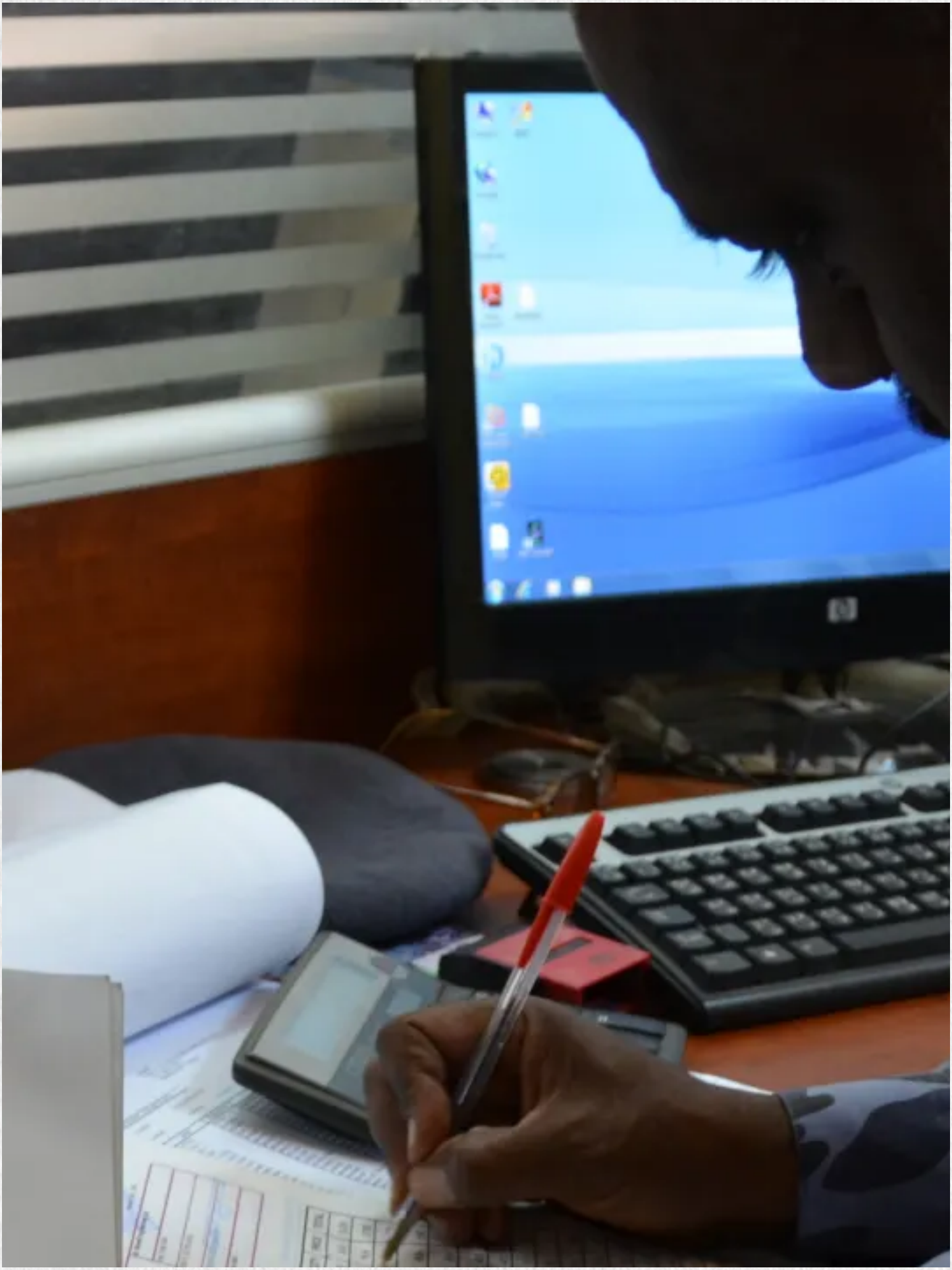
To function effectively, the Ministry should be built around four core directorates, each with clear mandates:

1. **Policy Development Directorate:** responsible for setting national transport policy, long-term planning, investment prioritisation, and coordination with other ministries and international partners;

2. **Regulatory Affairs Directorate:** in charge of licensing, safety standards, environmental compliance, and enforcement across all modes of transport;

3. **Agency Oversight Directorate:** tasked with supervising state-owned and autonomous entities involved in roads, transit, ports, rail, and aviation, ensuring they meet performance, transparency, and service delivery goals;

4. **Transport Infrastructure and Program Delivery Directorate:** responsible for capital project implementation, results monitoring, and management of public-private partnerships (PPPs).



The new Ministry must be practical and lean yet built with the capacity to deliver. Sudan does not have the luxury of bloated institutions, but it cannot afford a hollow ministry either. It must be streamlined, effective, and "small but mighty," focused on building strong internal capacity rather than overreliance on external consultants. A well-staffed ministry with the technical ability to review procurement packages, assess project proposals, conduct regulatory audits, and manage complex PPPs is not a luxury, it is a necessity.

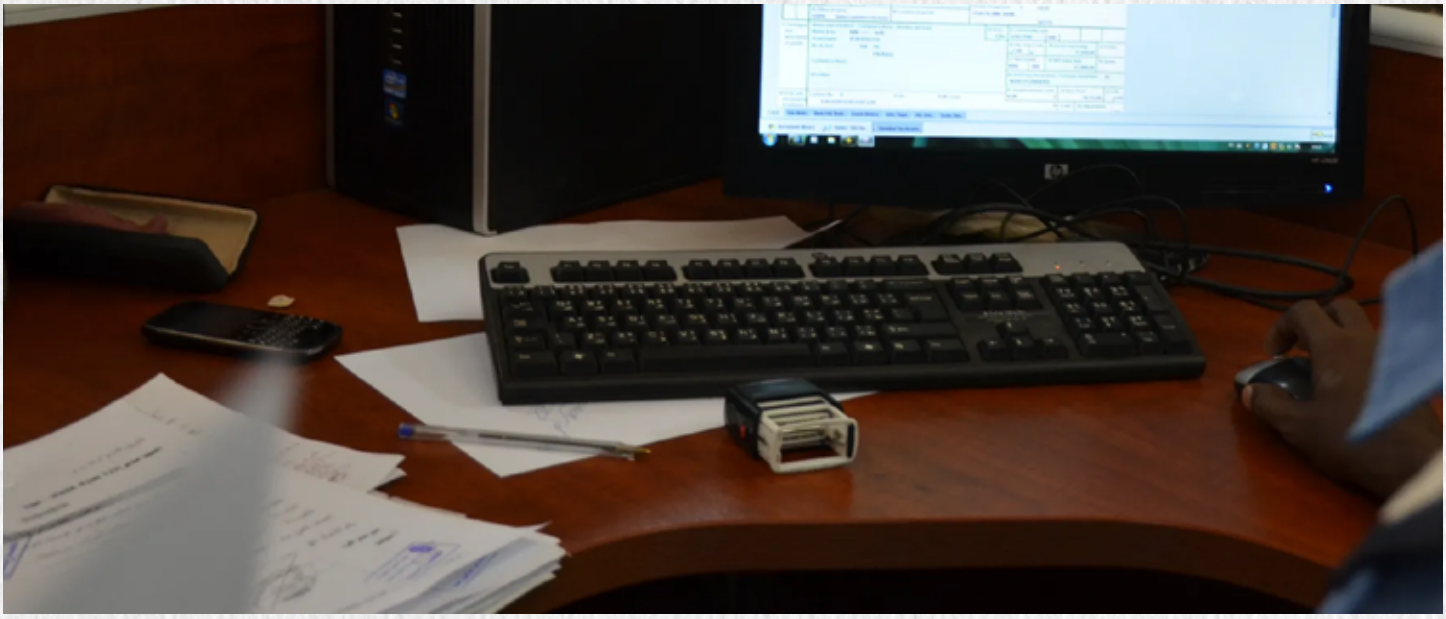
Without in-house knowledge and oversight, Sudan will not extract value from PPPs or donor-financed investments. Projects may proceed, but they will do so on donor or contractor terms, not Sudanese ones. Institutional weakness in transport ministries across the continent has too often led to inflated costs, underperforming projects, and lack of public trust. Sudan can avoid this by investing early in its own public sector institutions.

While fiscal constraints are real, designing a ministry that delivers value for the Sudanese public must be a core goal. Every Sudanese pound spent by the Ministry, whether in a regional road upgrade, a bus system in a secondary city, or a new terminal at Port Sudan, must be deployed with purpose, discipline, and a commitment to national development. A strong Ministry of Transport is not just a bureaucratic necessity; it is a foundational institution for rebuilding a functioning, inclusive, and connected Sudan.

ROLE AND WORK PLAN FOR THE FOUR CORE DIRECTORATES

A restructured Ministry of Transport with four clearly defined, professionally staffed, and well-resourced directorates offers Sudan a viable path forward to re-establish transport governance in a post-conflict context. Each directorate must be capable of operating both independently and in coordination with others, aligned under a unified national vision.

If built intentionally with structure, skills, and strategy in place, this Ministry can lead not just the recovery of physical infrastructure, but the restoration of trust in public institutions and the creation of a more connected, inclusive, and prosperous Sudan. The goal is to ensure that each directorate is grounded in operational realities while offering clarity on its strategic purpose, priority functions, and initial work programme. This structure is designed to foster an agile and professional institution that can coordinate a complex post-conflict recovery effort across multiple modes of transport.





1. POLICY DEVELOPMENT DIRECTORATE

This directorate would be responsible for formulating national transport policies, developing long-term investment frameworks, and coordinating with donors. It would lead the creation of a comprehensive national transport strategy, design funding models, and engage with international partners to align Sudan's transport initiatives with global best practices.

MANDATE

The Policy Development Directorate is the strategic brain of the Ministry. It is responsible for formulating coherent, long-term national transport policies and plans that align with economic recovery, regional integration, and national development objectives. It also coordinates transport-sector input into broader national planning efforts and manages donor dialogue on transport reform and investment.

KEY RESPONSIBILITIES

- Draft and update national transport strategies and modal masterplans (road, rail, air, maritime, urban transport);
- Develop medium-term investment frameworks, and identify priorities across corridors and sectors;
- Ensure cross-sectoral policy alignment with ministries of finance, planning, environment, and local government;
- Coordinate with state and regional offices to incorporate local transport priorities into national strategies;
- Lead public and stakeholder consultations on transport policy reforms;
- Manage engagement with international partners, donors, and multilateral development banks.

INITIAL WORK PLAN

- Prepare a five-year National Transport Sector Recovery and Investment Plan (2025–2030);
- Finalise a draft Urban Mobility Policy Framework for metropolitan regions (starting with Khartoum and Port Sudan);
- Conduct a diagnostic review of past national transport plans (including defunct masterplans from pre-conflict years);
- Establish a National Transport Policy Coordination Committee with representatives from Develop the ministry's annual performance reporting process, with transport sector indicators.

2. REGULATORY AFFAIRS DIRECTORATE

Tasked with setting national standards, this directorate would manage operator licensing and enforce safety, environmental, and service requirements across all modes of transport. It would develop and implement regulations to ensure the safety and reliability of transportation services, as well as compliance with environmental standards.

MANDATE

The Regulatory Affairs Directorate ensures that transport operations and infrastructure comply with national laws and international standards. It licenses operators, enforces safety regulations, monitors environmental impacts, and protects consumer and labour rights within the transport sector. Its role is particularly critical as Sudan seeks to modernise and formalise historically informal or unregulated transport systems.

KEY RESPONSIBILITIES

- Develop and enforce safety regulations across road, rail, maritime, and air transport;
- Oversee vehicle standards, emissions regulations, operator licensing, and insurance requirements;
- Set service quality benchmarks and accessibility standards for public transport;
- Monitor compliance through inspections and digital reporting mechanisms;
- Establish guidelines for vehicle imports, fuel quality, and maintenance regimes;
- Lead environmental permitting and climate impact assessments for major projects.

INITIAL WORK PLAN

- Update national road safety regulations in alignment with the African Union and UNECE guidelines;
- Establish national vehicle and operator licensing systems with digital registration and renewal
- Create a framework for service permits and fare regulations for public and paratransit operators;
- Develop a compliance monitoring programme for the commercial freight sector (including truck weights, axle loads, and emissions);
- Launch a public complaints and regulatory appeals mechanism.

3. AGENCY OVERSIGHT DIRECTORATE

This directorate would supervise independent agencies responsible for roads, transit, ports, and aviation, ensuring accountability and performance. It would monitor the activities of these agencies, evaluate their performance, and ensure that they operate in alignment with national transport objectives.

MANDATE

This directorate serves as the Ministry's supervisory and performance-management arm. It ensures that public transport agencies, state-owned enterprises (SOEs), and infrastructure authorities, such as the Sudan Railways Corporation, the Sea Ports Corporation, and future regional transit commissions, are operating effectively, transparently, and in line with national policy goals.



Authors presenting Khartoum BRT and infrastructure plan pre-conflict.

KEY RESPONSIBILITIES

- Set performance benchmarks and service agreements for SOEs and parastatals;
- Review and approve strategic and capital budgets for public transport agencies;
- Ensure compliance with procurement, financial, and operational standards;
- Provide technical and institutional capacity support to agency leadership;
- Lead reforms of underperforming or defunct transport institutions;
- Coordinate agency-level donor support to prevent duplication or fragmentation.

INITIAL WORK PLAN

- Undertake institutional performance audits of the Sudan Railways Corporation, the Sea Ports Corporation, and the Civil Aviation Authority;
- Establish quarterly reporting and monitoring dashboards for all transport SOEs;
- Draft model governance frameworks and board structures for transport agencies;
- Identify priority agency reforms (e.g., corporatisation, restructuring, or merger proposals);
- Begin work on the eventual creation of a National Transit Support Company or national operator.

4. TRANSPORT INFRASTRUCTURE AND PROGRAMME DELIVERY DIRECTORATE

Leading the implementation of capital projects, this directorate would oversee results monitoring and manage public-private partnerships. It would be responsible for the delivery of large infrastructure projects, ensuring they are completed on time and within budget, and that they meet the intended objectives.

MANDATE

This directorate is the Ministry's project-delivery and capital investment engine. It is responsible for managing the planning, financing, and execution of national infrastructure projects. This includes roads, bridges, ports, rail lines, public transit systems, and dry ports, either through direct implementation or coordination with agencies and partners. It also leads PPPs, donor-financed programs, and performance-based contracting initiatives.

KEY RESPONSIBILITIES

- Develop project pipelines and feasibility studies for priority transport investments;
- Lead procurement, contracting, and construction oversight of large infrastructure projects;
- Manage design and implementation of PPP frameworks, including viability gap financing and risk-sharing mechanisms;
- Maintain a national infrastructure delivery dashboard to track progress and delays;
- Develop public sector capacity to manage engineering, construction, and project finance without dependence on external consultants;
- Ensure social and environmental safeguards are integrated into all infrastructure projects.

INITIAL WORK PLAN

- Conduct a national transport infrastructure survey (including roads, bridges, terminals, and border crossings);
- Create a Project Preparation and Appraisal Unit for PPP and donor-financed projects;
- Develop a National Roads Investment Programme (including emergency rehabilitation corridors and priority trade routes);
- Issue standard templates for engineering and design-build procurement contracts;
- Recruit in-house engineering, legal, and project finance advisors to reduce reliance on external consultants.

BUILDING A CAPABLE, PRIORITISED AND INCLUSIVE TRANSPORT MINISTRY IN POST-CONFLICT SUDAN

ESTABLISHING THE MINISTRY AND SENIOR LEADERSHIP

The first step towards implementing the proposed transport reform agenda is the formal re-establishment of the Ministry of Transport. This includes the legal designation of the Ministry's mandate, approval of its initial operating budget, and the appointment of a Minister by the transitional government. The Minister will serve as the public face of the transport sector, setting national policy direction, representing Sudan in regional and international forums, and providing political leadership during the recovery period.

Following ministerial appointment, the recruitment of a senior leadership team must begin immediately. A top priority is the identification and appointment of a capable, experienced Wakil (or Director General). This role should be filled by a Sudanese national with significant international technical experience, ideally in the Gulf or East Africa, and with a demonstrable understanding of Sudan's transport landscape. This individual must have the credibility and capacity to build a senior management team from scratch and set a standard of professionalism, innovation, and integrity.

RECRUITMENT, TEAM CULTURE, AND INSTITUTIONAL IDENTITY

The newly formed Ministry will need to attract technical professionals despite limited financial resources and challenging working conditions. Competitive salaries may not be feasible in the immediate term. To overcome this, the Ministry's leadership must foster a high-performing institutional culture built around purpose, teamwork, and public service. From the outset, the Ministry should project itself as a mission-driven entity, one that offers skilled Sudanese professionals a chance to contribute meaningfully to national recovery.

Staff recruitment should be guided by a commitment to regional and demographic diversity. A representative workforce will allow the Ministry to respond more effectively to transportation needs across Sudan's diverse regions and will contribute to broader goals of national unity and inclusion. Where possible, the Ministry should also engage members of the Sudanese diaspora who have gained critical technical and management experience abroad and are committed to contributing to national reconstruction.

PRIORITISATION AND STRATEGIC PLANNING

Given the scale of the proposed reforms and limited state capacity, it will not be feasible to implement all initiatives simultaneously. During its first six months, the Ministry should undertake a structured prioritisation exercise, leading to the development of a three-year strategic implementation roadmap. This document should identify Phase I initiatives that are foundational to national reconstruction. These may include restoration of critical north–south road links, reactivation of key railway corridors such as Atbara–Khartoum, implementation of the Soba Dry Port pilot, and resumption of participation in regional coordination bodies such as IGAD and COMESA.

The roadmap need not be complex or overly technical. It must, however, be realistic, deliverable, and clearly sequenced. It should distinguish between quick wins, medium-term deliverables, and foundational investments that will support national and regional economic integration.

CORE OPERATIONAL SYSTEMS AND DELIVERY MANAGEMENT

In parallel with technical programming, the Ministry must establish its internal operational infrastructure. This includes putting in place basic procurement procedures, project delivery frameworks, and financial management systems that allow for transparent contracting and expenditure tracking.
A small Monitoring and Delivery Unit should be created within the Minister's office. This team will be responsible for tracking progress on top-priority initiatives, supporting coordination across departments, and elevating bottlenecks to senior leadership.

As the Ministry grows, it should work towards building interoperable systems across directorates, for example, unified reporting tools for road, rail, aviation, and maritime sectors. These shared systems will reduce duplication, support transparency, and allow for better data-driven decision-making over time.

BALANCING POLITICAL ACUMEN WITH TECHNICAL DELIVERY

While the Ministry's primary mission is technical, political acumen will be essential for success in a transitional context. The leadership team must be capable of managing political relationships with the Prime Minister's office, other ministries, regional governments, and key national stakeholders.
In some cases, this will require blending subject-matter expertise and political insight within the same individuals. In others, a deliberate structure will be needed to ensure that technocratic leadership is effectively supported by political advisers and institutional liaisons.

The Ministry must maintain its role as a policy-neutral delivery agency, while also serving the strategic priorities of the government of the day. This balance will require diplomatic skill, strategic communications, and high-integrity leadership.

COMMUNICATIONS AND CITIZEN ENGAGEMENT

Transparent and proactive communication will be critical. The Ministry must be able to explain its goals, report progress to the public, and respond effectively to concerns or setbacks. A dedicated communications unit should be established early on, capable of engaging across multiple platforms and languages. This unit must serve three primary audiences: Sudanese citizens, international partners, and internal government stakeholders.

Digital communications should be simple and consistent. Regular updates on project milestones, budget execution, and policy changes will foster public trust and stakeholder confidence. At the same time, the Ministry must develop a protocol for engaging international media and diplomatic stakeholders, especially as it begins to secure external funding and re-enter regional and global infrastructure networks.

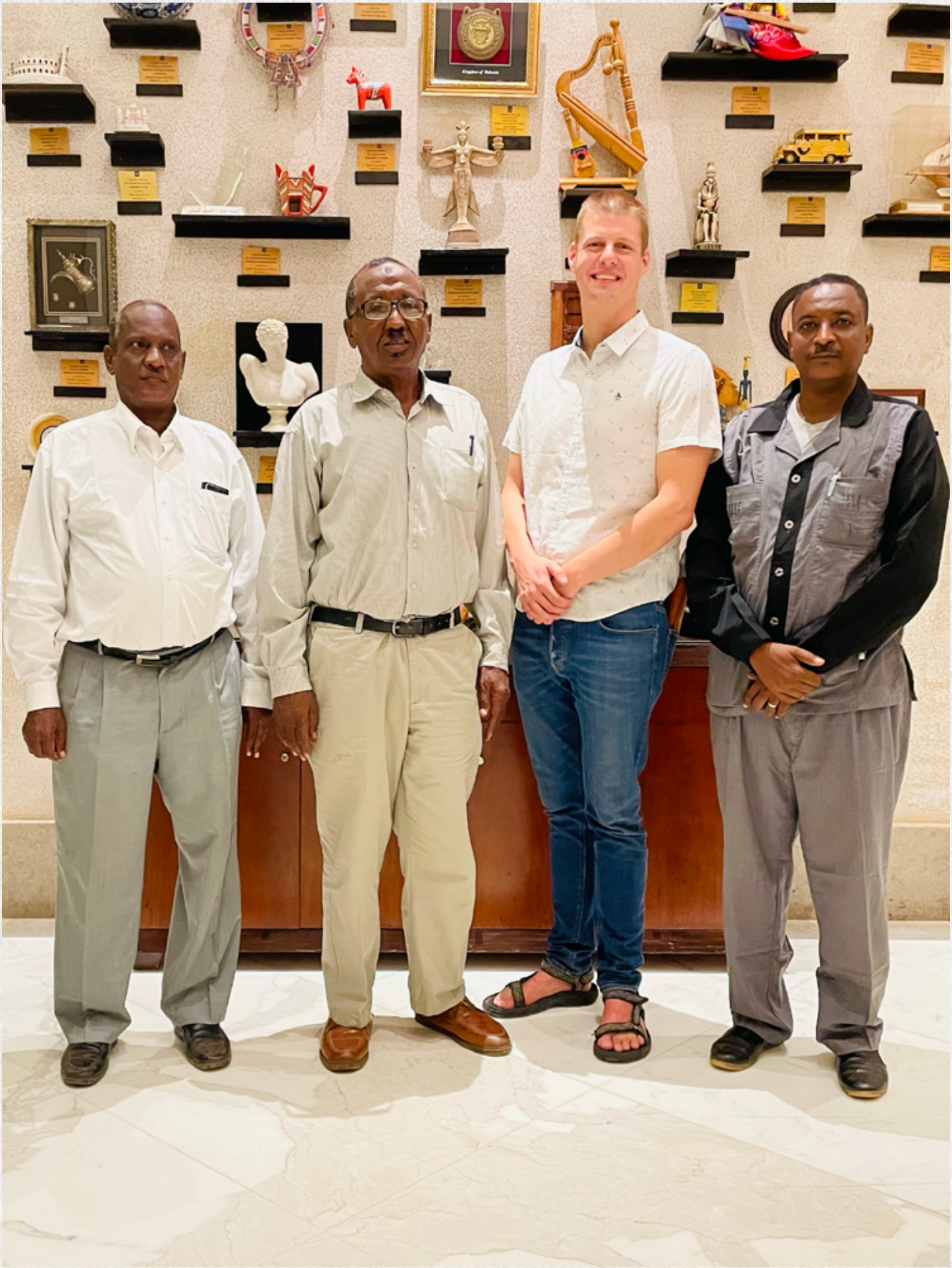
INTERNATIONAL RE-ENGAGEMENT AND PARTNERSHIP DEVELOPMENT

Reconnecting Sudan's transport sector with global and regional partners is not only strategic; it is essential to mobilising capital, technical support, and policy alignment. The Ministry should re-establish working relationships with institutions such as the African Union's Programme for Infrastructure Development in Africa (PIDA), the UNECA-led African Trade Facilitation Platform, and Sustainable Mobility for All. It should also engage proactively with bilateral donors, the European Union, the Islamic Development Bank, the Arab Fund for Economic and Social Development, and Gulf-based development institutions.

Formal re-engagement will require rebuilding institutional relationships, participating in international working groups, and positioning Sudan as a viable recipient of investment. This work must begin immediately upon the Ministry's establishment and should be led by senior leadership with diplomatic and technical credibility.

9.0 ENHANCEMENT OF CUSTOMS & TRADE FACILITATION PROCESSES

Improving customs processes and infrastructure at both coastal and inland ports is critical to reducing delays, attracting trade, and increasing revenue collection. Implementing advanced management information systems can streamline cargo tracking, enhance transparency, and facilitate real-time decision-making. Additionally, adopting risk-based inspection protocols and simplifying documentation requirements will expedite clearance procedures and improve overall port efficiency.



9.1

ENHANCING CUSTOMS AND TRADE FACILITATION IN SUDAN THROUGH INTEGRATED PORT & TRANSPORT AUTHORITY REFORM

CONTEXT AND STRATEGIC IMPORTANCE

Sudan's re-emergence as a functioning, competitive economy depends in large part on its ability to move goods efficiently, collect revenue fairly, and regulate borders credibly. Customs and trade facilitation reform, anchored in digital transformation and institutional integration, is essential to this effort.
A sequenced, well-governed implementation strategy will be necessary, beginning with leadership and coordination mechanisms, followed by targeted pilots in Port Sudan and Soba, scaling up physical and institutional improvements, and finally integrating Sudan into regional trade regimes. With the right investments, partnerships, and governance reforms, Sudan can transform its customs system from a bottleneck into a driver of recovery and growth.

Sudan stands at a pivotal moment in its post-conflict recovery. Years of economic deterioration protracted internal conflict, and global isolation have left critical state institutions, including customs and port management, either hollowed out or reliant on legacy systems that cannot support the needs of a modernising economy. As the country undertakes reconstruction and re-engagement with global and regional partners, the transformation of its customs and trade facilitation systems has emerged as a national imperative.

Efficient customs operations are central to government revenue collection, the enforcement of regulatory standards, and the movement of legitimate goods across borders. At the same time, Sudan's strategic location, linking the Red Sea to the interior of Africa, gives it extraordinary potential to become a regional logistics corridor for landlocked neighbours such as South Sudan and Chad. However, this potential has been undermined by outdated infrastructure, paper-based clearance systems, fragmented institutional arrangements, and lengthy delays at seaports and land border crossings. Excessive dwell times, inefficient inspection processes, and poorly coordinated agencies contribute to significant economic losses and erode the country's competitiveness in global trade.

This moment of transition offers Sudan the rare opportunity to rebuild its customs and trade systems from the ground up. Through the integration of modern digital platforms, institutional reform, and targeted infrastructure investment, Sudan can lay the foundation for a transparent, accountable, and high-performing logistics and clearance regime. Crucially, this effort must be embedded within a broader national strategy that links customs reform to the modernisation of transportation infrastructure, including seaports, dry ports, and border crossings, and to the reconstitution of capable and empowered general transportation authorities.

9.2

INSTITUTIONAL INTEGRATION & GOVERNANCE REFORM

The first pillar of reform must address the institutional fragmentation that currently hampers trade facilitation. In Sudan, customs, port management, taxation, and trade policy functions are often siloed, with overlapping mandates and insufficient coordination. To address this, a National Trade Facilitation and Customs Reform Unit should be established under the Ministry of Transport or a reconstituted Ministry of Ports and Customs.

This unit should be empowered to coordinate inter-agency reforms, harmonise processes across departments, and align national systems with the WTO Trade Facilitation Agreement. It should also serve as the lead body for coordinating technical assistance and capacity-building initiatives funded by development partners. Critically, the unit must include a standing advisory forum with representation from the private sector, port operators, freight forwarders, and chambers of commerce to ensure that reforms are grounded in operational realities.

In parallel, Sudan should re-establish a National Ports Authority as a semi-autonomous body with responsibility for the management, regulation, and development of both coastal and inland ports. This agency should be tasked with integrating customs operations into port design and management, creating joint operational command centres at major ports such as Port Sudan and Suakin, and ensuring that customs officers, shipping agents, and logistics operators are co-located within single-window terminals. Such physical and institutional co-location is essential to improving coordination, reducing duplication, and fostering a performance-oriented culture within port environments.



9.3

INFRASTRUCTURE MODERNISATION

Rebuilding Sudan's customs ecosystem will also require major investment in port and border infrastructure. At coastal ports such as Port Sudan, which handles over 90 percent of Sudan's maritime trade, basic facilities such as quay surfaces, bonded warehouses, scanning equipment, and truck staging areas must be urgently rehabilitated. Congestion at Port Sudan is a chronic problem, exacerbated by long clearance times, outdated inspection procedures, and limited space. Addressing this will require the expansion of customs yards, the installation of modern non-intrusive scanning equipment, and the introduction of green-lane pre-clearance areas for low-risk cargo.



Beyond the coast, inland dry ports such as the emerging facility at Soba outside Khartoum must be prioritised. These ports are vital to decongesting coastal terminals, decentralising customs clearance, and supporting industrial development near the capital. The development of dry ports should be integrated with future rail corridors and include full-service customs offices, tax administration units, and digital interconnection with seaports. To ensure consistency and security, bonded corridors must be established between Port Sudan and Khartoum, with GPS tracking and risk-based enforcement along the route.

Sudan's land borders with Ethiopia, South Sudan, and Chad also require attention. These crossings are critical to transnational commerce but are often informal and poorly regulated. The establishment of One-Stop Border Posts (OSBPs) at strategic locations would allow customs, immigration, standards, and security services to operate within a single facility, using harmonised clearance procedures and shared databases. This model has proven successful in East Africa and should be adapted to the Sudanese context with support from COMESA and IGAD partners.

9.4 CUSTOMS PROCESS MODERNISATION

At the core of customs reform is the transition from paper-based, manual processing to a digital, risk-based approach. Sudan must abandon its current reliance on blanket physical inspections in favour of a selective Risk-Based Inspection System (RBIS). This system should use trader compliance histories, cargo profiles, and advance shipping data to determine which consignments require inspection. Implementing such a system would sharply reduce average clearance times and allow customs officers to focus resources on high-risk shipments.

In support of this, Sudan must develop a national Electronic Single Window (ESW) for trade documentation. This platform should allow traders to submit all customs, standards, and port documentation electronically in one place, and enable online payments, pre-arrival processing, and real-time status tracking. The Single Window should be rolled out in phases, beginning with Port Sudan and Soba, and eventually expanded to land border posts.

Advance Cargo Information systems should also be adopted, requiring shipping documents to be submitted 48 to 72 hours prior to the arrival of goods. This will allow customs to conduct pre-arrival risk assessments and allocate shipments to green, yellow, or red channels based on compliance status. These reforms must be accompanied by simplified regulatory procedures and standardised documentation to reduce ambiguity and promote predictability for traders.

9.5

DIGITAL INTEGRATION & DATA SYSTEMS

All customs modernisation efforts must be anchored in a robust digital ecosystem. A unified Port and Customs Management Information System should be deployed nationwide, integrating customs, port authorities, transportation regulators, and revenue agencies. This platform should enable real-time tracking of cargo, provide performance dashboards for supervisors, and generate audit trails for accountability. It should also include public-facing tools that allow traders to view clearance times, inspection rates, and contact points for resolving delays.

GPS tracking of transit vehicles is another essential investment. Vehicles moving under customs bond should be fitted with tracking devices that alert customs in the event of route deviations, delays, or unauthorised stops. Such systems not only reduce fraud but also enhance transparency and security in long-distance cargo movement.

Sudan should also pursue bilateral data-sharing arrangements with key neighbours, including Ethiopia, Egypt, South Sudan, and Chad. By exchanging cargo manifests, trader profiles, and valuation benchmarks, Sudan can reduce the risk of misdeclaration, coordinate enforcement, and harmonise inspection procedures along transnational corridors.

9.6

REVENUE COLLECTION & COMPLIANCE INCENTIVES

Improving customs revenue collection is a priority for Sudan's fiscal recovery. To achieve this without increasing burdens on legitimate traders, Sudan should launch an Authorised Economic Operator (AEO) programme. This programme would certify compliant companies for expedited processing, fewer inspections, and deferred payment options. The AEO model builds trust between customs and high-performing operators and frees up resources to focus on non-compliant or high-risk traders.

To further support revenue collection, Sudan must modernise its payment systems. All customs fees and duties should be payable via mobile money and online banking platforms. A real-time reconciliation system should be implemented to track payments, reduce fraud, and increase efficiency.

9.7

TRAINING, INTEGRITY, & CHANGE MANAGEMENT

Reforms of this magnitude cannot succeed without significant investment in people. Sudan should establish a Customs and Trade Facilitation Training Institute to provide continuous professional development for customs officers, port workers, and private sector users. The curriculum should include modules on valuation techniques, ethics, digital tools, and risk management. Partnerships should be sought with the World Customs Organization, UNCTAD, and regional institutions for certification and curriculum design.

Anti-corruption measures must be integral to the reform agenda. These include the routine rotation of customs officers at high-risk posts, the use of CCTV in inspection and clearance areas, and the creation of whistleblower protection mechanisms. Internal audits and disciplinary procedures must be enforced transparently to restore public trust in customs operations.

Peer learning should also be encouraged. Sudanese customs managers should participate in exchanges with counterparts in Kenya, Rwanda, and Ethiopia, countries that have made significant strides in customs modernisation under similar constraints.

9.8

STRENGTHENING HUMAN CAPITAL & CAPACITY BUILDING

Developing a skilled workforce is vital for the successful operation and management of port facilities. Comprehensive training programmes should be established to enhance the technical and managerial competencies of port personnel. Collaborations with international organisations and educational institutions can provide access to best practices and facilitate knowledge transfer, ensuring that Sudan's port sector remains competitive and responsive to global trade dynamics.



9.9 INTEGRATION WITH REGIONAL & GLOBAL TRADE NETWORKS

Sudan's strategic location along the Red Sea positions it as a potential hub for regional and global trade. By integrating its port infrastructure with regional transportation corridors and participating in international trade agreements, Sudan can enhance its connectivity, attract foreign investment, and stimulate economic development. Efforts should be made to harmonise regulations, standardise procedures, and promote interoperability to facilitate seamless cross-border trade.

MONITORING AND EVALUATION

Finally, Sudan must adopt a performance-driven approach to reform. Key performance indicators, such as average clearance times, inspection rates, revenue per tonne, and user satisfaction, should be tracked consistently. These indicators should be published in a quarterly Customs and Port Performance Dashboard that informs performance-based management contracts and builds accountability across agencies.

10 FINAL REFLECTIONS & SUMMARISED NEXT STEPS

The scale of reform outlined in this report is significant, but achievable. In a post-conflict environment, the Ministry of Transport has an opportunity to lead by example, delivering practical results while also modelling a new kind of public leadership rooted in professionalism, unity, and purpose.

By building a representative, mission-driven team, prioritising smartly, and re-engaging with the international community, Sudan's transport sector can serve as a key driver of national reconstruction. This is not merely a technical task; it is a political, social, and nation-building endeavour. With discipline, transparency, and collective resolve, Sudan can rebuild not only its infrastructure, but the institutions needed to manage it for future generations.

TRANSPORTATION, ENVIRONMENTALISM, & A PRAGMATIC PATH FORWARD FOR SUDAN

Sudan's transportation sector sits at a critical juncture, not only in the context of post conflict reconstruction but also in relation to broader environmental and sustainability goals. Unlike highly motorised societies, Sudan begins from a fundamentally different baseline, one in which most people already walk, cycle, or rely on low emission public transport options such as minibuses, tuk tuks, and informal transit networks. As the country rebuilds, it faces a key strategic choice: whether to preserve and strengthen this low impact mobility pattern or to follow the path of rapid motorisation that has fuelled congestion, emissions, and environmental degradation elsewhere.

From an environmental perspective, Sudanese cities and towns are already among the least carbon intensive in the world in terms of per capita transportation emissions. The average Sudanese citizen produces a fraction of the greenhouse gas emissions associated with transport compared to their counterparts in wealthier countries. This is not due to technology or regulation, but rather to structural realities: limited car ownership, strong informal public transport networks, compact urban form, and the continued dominance of walking as a mode of travel.

The imperative, then, is not to green a highly polluting system, but to prevent the emergence of one. That means resisting the temptation to invest heavily in car centred infrastructure such as flyovers, expressways, or multilane urban arterials that would inadvertently encourage car ownership and undermine existing low carbon habits. These types of projects, often framed as symbols of modernisation, typically lead to increased energy consumption, fragmented urban fabric, and social exclusion, especially for low income populations who cannot afford private vehicles.

Instead, environmentalism in Sudan's transport sector must be deeply pragmatic and people centred. Investment should prioritise keeping people on foot and in shared vehicles by improving the infrastructure and services they already use. That means expanding shaded pedestrian corridors, rehabilitating sidewalks, building safe crossings, and ensuring that informal transport operators can operate clean, well maintained vehicles under fair regulatory frameworks. It also means creating incentives to maintain or upgrade the large fleet of existing minibuses rather than replacing them with high cost imported technologies that may not be sustainable in the long run.

Supporting non motorised transport also has co benefits beyond emissions reduction. Walking infrastructure, for instance, enhances public health, supports economic activity at the street level, and promotes gender inclusive mobility. In rural areas and secondary towns, where formal transport options are limited, improved pathways and simple transit facilities can have outsized impacts on access to markets, schools, and healthcare.

Environmental policy should also support the transition to cleaner fuels and better vehicle standards where appropriate, but without imposing burdens that would drive informal operators out of the market. Pilot projects involving electric tuk tuks or solar powered transit hubs may offer scalable solutions, particularly where reliable electricity access exists. However, such technologies must be introduced with care, linked to local maintenance capacity and supported by a realistic understanding of energy supply constraints.

Finally, Sudan's environmental approach to transport should be grounded in climate resilience. Road construction and maintenance must account for increasingly variable weather conditions including floods and desertification. Green infrastructure such as permeable surfaces, urban tree cover, and stormwater sensitive road design can help mitigate environmental damage while improving the livability of cities.

In short, Sudan has an opportunity to avoid the environmentally destructive trajectory followed by many urbanising countries. By resisting a car centred model and instead reinforcing public and non motorised transport, Sudan can preserve its low emission mobility patterns, reduce future adaptation costs, and support inclusive and sustainable urban development. Environmentalism in Sudan's transport sector should not be about adopting expensive high tech systems from elsewhere, but about protecting what already works and improving it through modest, well targeted investment.

IMPROVING BUREAUCRATIC AND ADMINISTRATIVE EFFICIENCY

One of the most immediate benefits of AI in Sudan's transport sector lies in its ability to streamline bureaucratic and administrative processes. Many of the delays and inefficiencies currently experienced, whether in project approvals, inter-agency coordination, or procurement management, can be significantly reduced through the use of intelligent automation tools. AI systems can handle repetitive administrative tasks such as document processing, workflow tracking, and progress reporting with greater speed and accuracy than manual approaches. Furthermore, by analysing institutional workloads, AI can assist with optimal deployment of limited civil service personnel, directing staff capacity where it is most needed to resolve bottlenecks. This can result in faster decision-making, fewer errors, and greater transparency across all levels of transport governance.

REFORMING PERMIT AND LICENSING MANAGEMENT

AI can also play a transformative role in how the Sudanese state manages transport permits and licences. Currently, these processes are often slow, opaque, and susceptible to fraud or corruption. AI-based platforms can be deployed to assess and validate permit applications for freight vehicles, drivers, transport operators, and infrastructure works. These platforms can cross-reference applicant information with existing databases, flag inconsistencies, and ensure compliance with regulatory criteria in a manner that is both consistent and scalable. Renewals can be automated through smart notification systems, while advanced systems can integrate geospatial analysis to assess proposed infrastructure locations against land-use plans and environmental considerations. This would significantly enhance regulatory capacity in regions where human resources are thin and enforcement is difficult. By building a digital, AI-assisted permitting environment, Sudan can vastly reduce administrative delays, cut costs, and build public confidence in the licensing system.

SUPPORTING DATA-DRIVEN POLICY DEVELOPMENT AND PLANNING

In a country where much transport planning is done with limited or outdated data, AI opens new possibilities for evidence-based policymaking. AI can process vast and diverse data sources, including mobile phone location data, satellite imagery, GPS traces, fare collection systems, and even social media inputs, to build a real-time picture of travel behaviour, freight flows, and bottlenecks across the country. These insights can be used to model the effects of policy changes, such as new tolls, transit investments, or congestion charges, before implementation. This enables policymakers to make informed, cost-effective decisions based on likely outcomes rather than assumptions. Moreover, AI can be used to assess the equity impacts of transport decisions, helping to identify communities that are underserved by current services or disproportionately affected by infrastructure gaps.

ENHANCING INFRASTRUCTURE MONITORING AND MAINTENANCE

AI also offers significant benefits in the monitoring and maintenance of physical infrastructure. Traditional methods for inspecting roads, bridges, and facilities are labour-intensive and prone to delays. AI models trained on drone footage or satellite imagery can automatically detect problems such as potholes, erosion, or structural weaknesses. Predictive maintenance algorithms can forecast when specific roads, airport runways, or railway segments are likely to fail, allowing for preventative repairs before service is disrupted. This not only extends the life of critical infrastructure but also allows the state to better allocate its limited maintenance budget. In environments where climate conditions or conflict-related damage are frequent, such early detection tools can prevent service breakdowns and improve network resilience.

IMPROVING PUBLIC TRANSPORT AND MOBILITY MANAGEMENT

In Sudanese cities with constrained public transport networks, AI can help improve service delivery by enabling demand-responsive systems. Rather than relying on fixed schedules that may not reflect actual usage, AI can process real-time data from buses, user apps, or ticketing systems to adjust frequencies and routing dynamically. This is especially valuable in cities where fleet sizes are small and operating margins are thin. In addition, AI can support fare enforcement and revenue protection through smart validation tools and fraud detection systems. These systems can help reduce fare evasion and improve financial sustainability. AI-driven crowd analysis can also be used at terminals and stations to manage congestion, improve safety, and guide investments in capacity upgrades.

BOOSTING PORT AND AIRPORT EFFICIENCY

At Sudan's ports and airports, particularly Port Sudan and key regional air hubs, AI can play a crucial role in improving logistics, cargo handling, and passenger processing. AI-powered systems can optimise container movements, manage inventory, and streamline customs procedures by automating paperwork and identifying anomalies in cargo manifests. This reduces wait times, increases throughput, and lowers operational costs. For passengers, AI can assist with queue management, security screening, and flight coordination, particularly in facilities operating at or beyond capacity. Risk-based screening enabled by AI improves border security while reducing unnecessary delays. These technologies allow Sudanese ports and airports to match international standards even in the absence of major physical upgrades.

BUILDING INSTITUTIONAL CAPACITY AND LOCAL OWNERSHIP

Finally, AI can help strengthen local institutions and reduce long-term reliance on foreign expertise. AI-powered platforms can be developed as training tools and planning aids for Sudanese engineers, planners, and policymakers, enabling them to simulate scenarios, test options, and build professional skills in a low-cost, self-guided manner. By adopting open-source AI models and developing digital governance systems, Sudan can leapfrog outdated technologies and build capacity that is tailored to its own institutional needs. This includes establishing national AI governance strategies, protecting data privacy, and training a new generation of civil servants in the ethical and effective use of digital tools.

For Sudan, AI offers more than technological modernisation, it provides a practical response to the challenge of doing more with less. In a country facing infrastructure deficits, institutional fragility, and constrained public finances, AI can deliver smarter, faster, and more equitable transport services. From automating permit systems and managing road maintenance, to designing transit routes and securing airport logistics, AI can be a cornerstone of post-conflict recovery and state-building. By investing in the right tools, partnerships, and human capacity, Sudan has the opportunity to leapfrog traditional development models and lay the foundation for a transport system that is data-driven, citizen-focused, and resilient.



Authors signing cooperation deal with Sudan National Railways

SUMMARY OF KEY ACTIONS FOR ESTABLISHING AND OPERATIONALISING THE MINISTRY OF TRANSPORT IN POST-CONFLICT SUDAN

- Appoint a Minister of Transport through the transitional government to lead national transport reconstruction and policy direction;
- Recruit an experienced Wakil or Director General with both Sudan-specific and international technical experience, capable of building a senior leadership team;
- Assemble a high-performing, mission-driven leadership team prioritising professionalism, inclusion, and national unity, with active outreach to the Sudanese diaspora;
- Develop a regionally representative recruitment strategy for technical and administrative staff to ensure diversity and legitimacy across Sudan's regions;
- Launch a structured three-year strategic planning process within the first six months, including a prioritisation exercise focused on Phase I deliverables;
- Identify and sequence early "quick wins," including restoration of key corridors (e.g., Port Sudan–Khartoum), pilot reactivation of Atbara–Khartoum railway, and operational launch of Soba Dry Port;
- Establish core institutional systems: procurement frameworks, financial controls, and project management tools to ensure accountable delivery;
- Create a small Monitoring and Delivery Unit in the Minister's office to track top-priority initiatives and coordinate implementation;
- Ensure political alignment by embedding political advisory capacity within the Ministry to support coordination with the Prime Minister's office and Parliament;
- Establish a communications division capable of engaging citizens, government stakeholders, and international partners, with multilingual digital platforms and media strategy;
- Reconnect Sudan's transport institutions with international and regional partners (AU, UNECA, COMESA, AfDB, World Bank, Islamic Development Bank, Arab Fund, etc.) to access technical and financial support;
- Prepare to rejoin international infrastructure coordination platforms (e.g., PIDA, Sustainable Mobility for All, African Trade Facilitation Platform);
- Promote a culture of public service, innovation, and integrity within the Ministry, compensating for limited financial resources with strong institutional identity and purpose;
- Develop policies to engage returning professionals and the diaspora through secondments, short-term technical advisory contracts, or direct appointments;
- Build internal systems for performance tracking, data management, and reporting, including the eventual rollout of a public-facing performance dashboard.